Fig.1

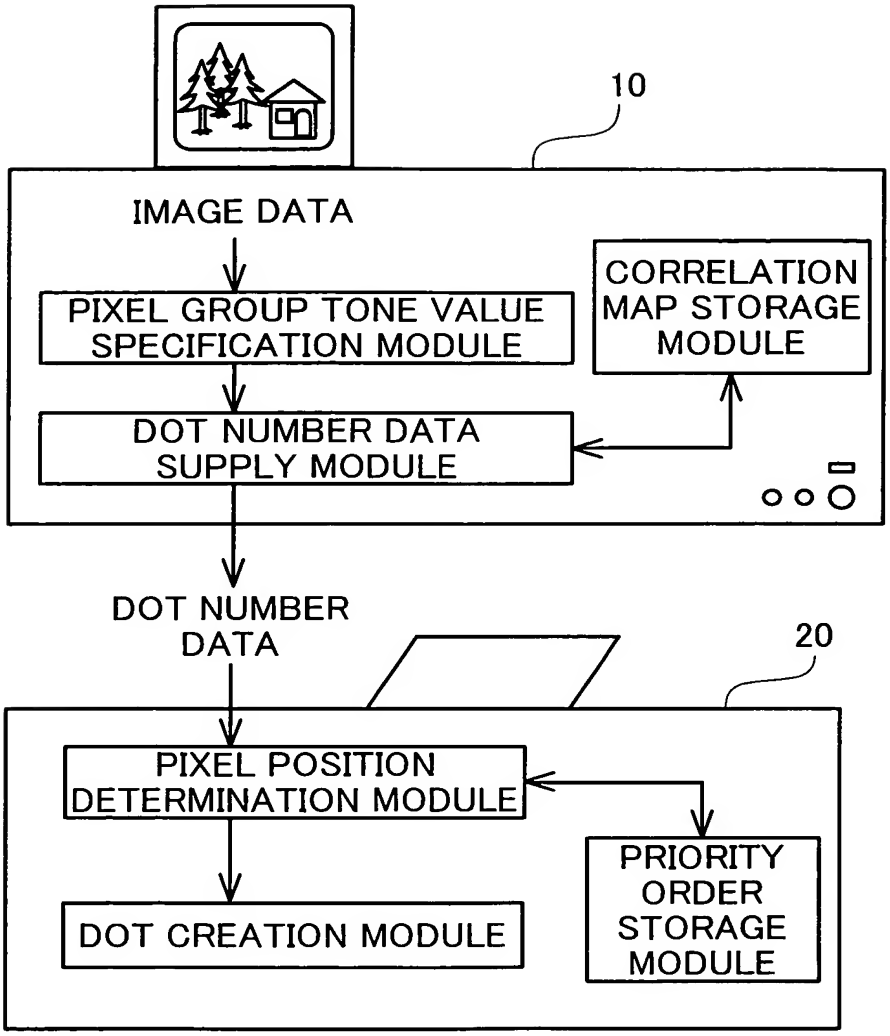

10
IMAGE DATA
PIXEL GROUP TONE VALUE SPECIFICATION MODULE
CORRELATION MAP STORAGE MODULE
DOT NUMBER DATA SUPPLY MODULE
DOT NUMBER DATA
20
PIXEL POSITION DETERMINATION MODULE
PRIORITY ORDER STORAGE MODULE
DOT CREATION MODULE

Fig.2

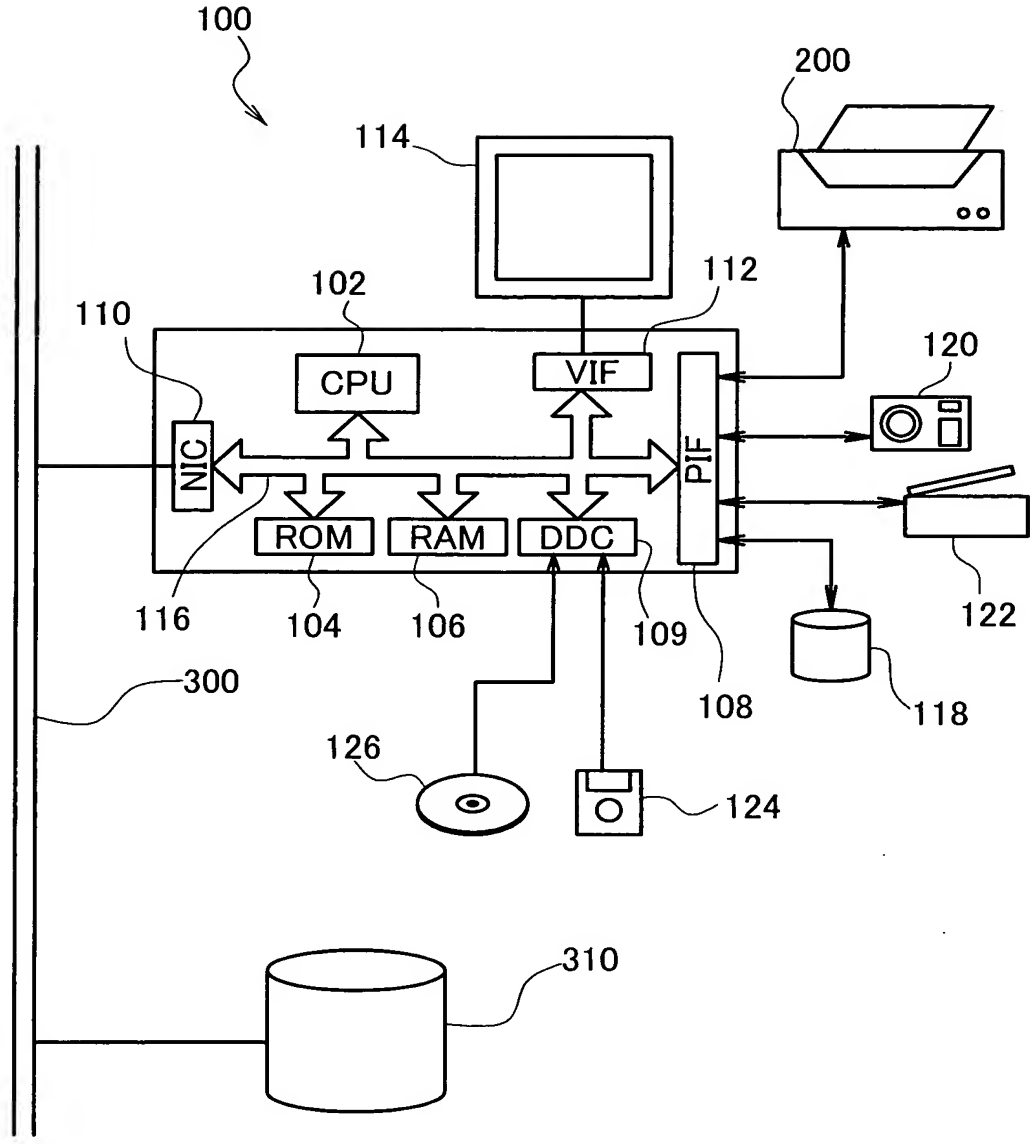

100
200
114
102
112
110
120
CPU
VIF
NIC
PIF
ROM
RAM
DDC
116
104
106
109
108
122
118
300
126
124
310

Fig.3

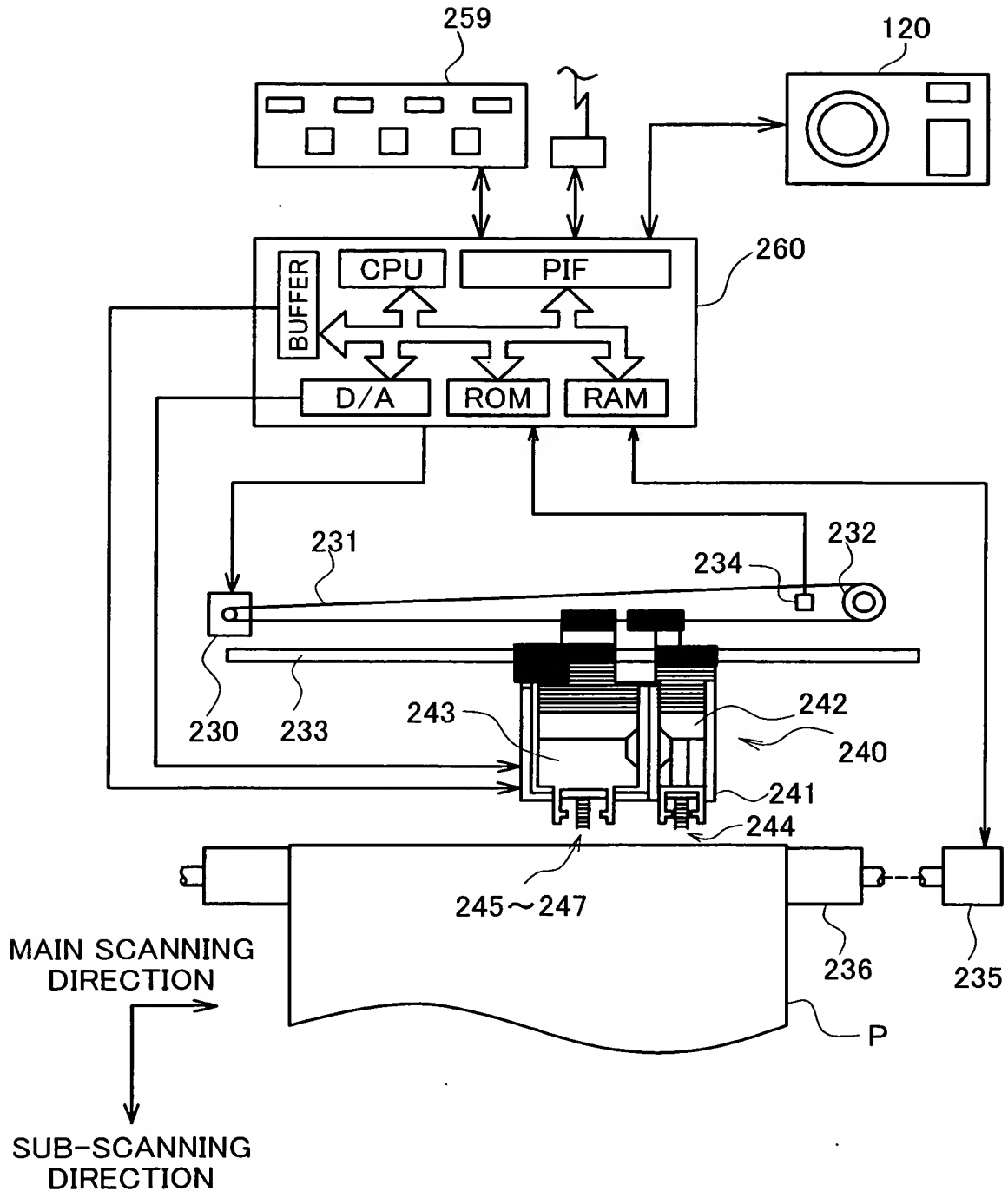

259
120
260
BUFFER
CPU
PIF
D/A
ROM
RAM
231
232
234
230
233
243
242
240
241
244
245～247
236
235
P
MAIN SCANNING DIRECTION
SUB-SCANNING DIRECTION

Fig.4

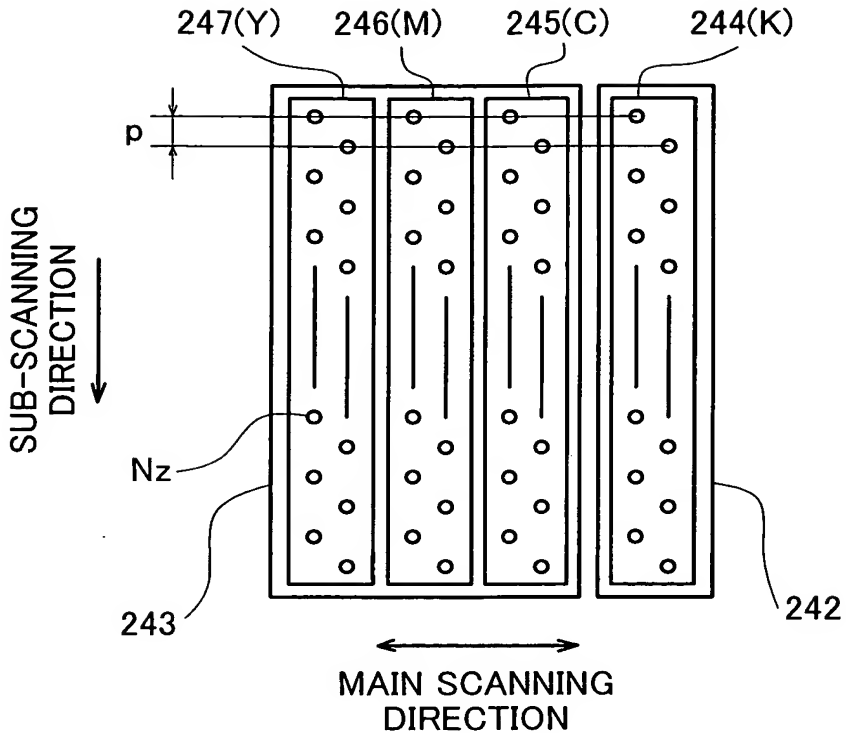

247(Y)
246(M)
245(C)
244(K)
p
SUB-SCANNING DIRECTION
Nz
243
242
MAIN SCANNING DIRECTION

Fig.5

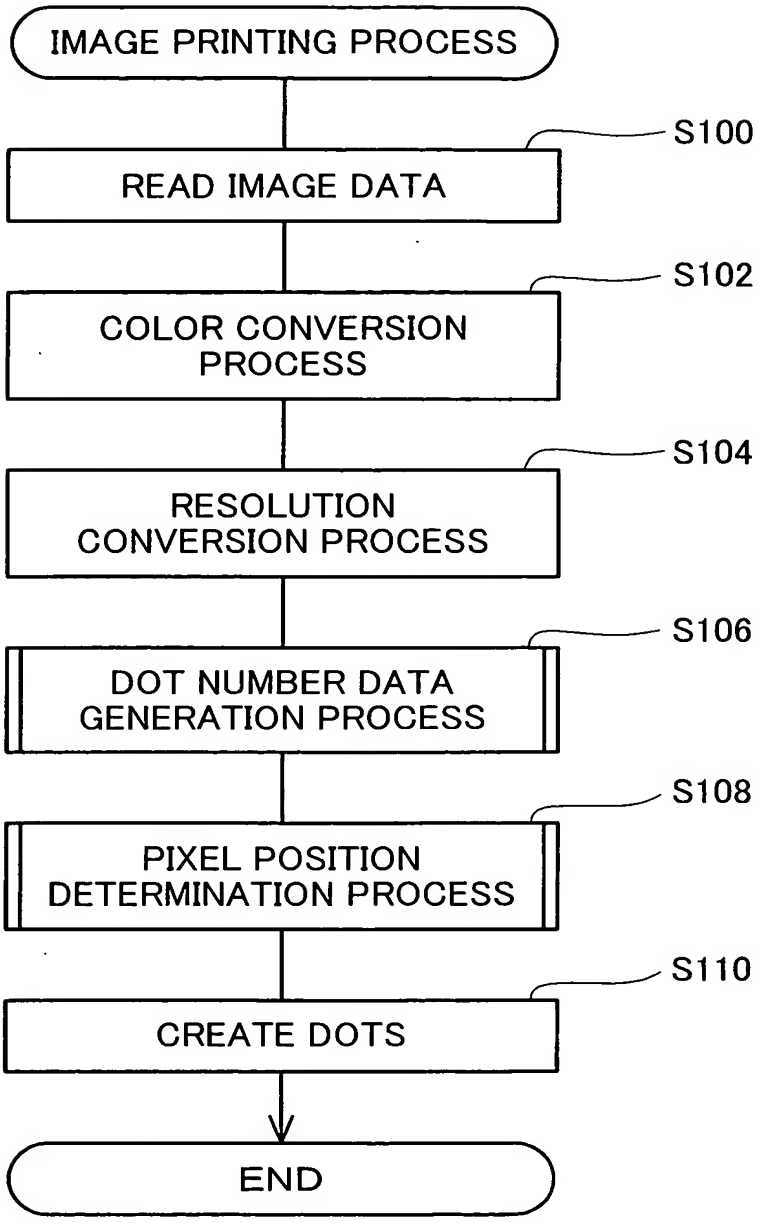
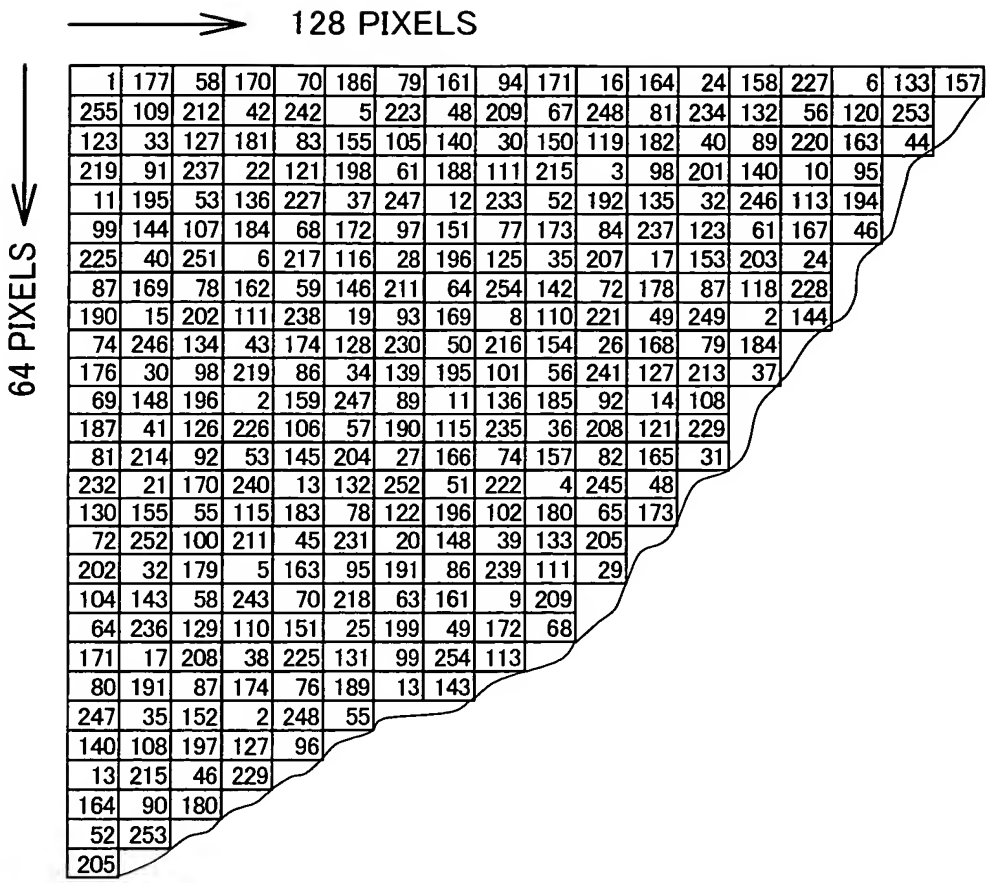


IMAGE PRINTING PROCESS
S100
READ IMAGE DATA
S102
COLOR CONVERSION PROCESS
S104
RESOLUTION CONVERSION PROCESS
S106
DOT NUMBER DATA GENERATION PROCESS
S108
PIXEL POSITION DETERMINATION PROCESS
S110
CREATE DOTS
END

Fig.6



1	177	58	170	70	186	79	161	94	171	16	164	24	158	227	6	133	157
255	109	212	42	242	5	223	48	209	67	248	81	234	132	56	120	253	
123	33	127	181	83	155	105	140	30	150	119	182	40	89	220	163	44	
219	91	237	22	121	198	61	188	111	215	3	98	201	140	10	95		
11	195	53	136	227	37	247	12	233	52	192	135	32	246	113	194		
99	144	107	184	68	172	97	151	77	173	84	237	123	61	167	46		
225	40	251	6	217	116	28	196	125	35	207	17	153	203	24			
87	169	78	162	59	146	211	64	254	142	72	178	87	118	228			
190	15	202	111	238	19	93	169	8	110	221	49	249	2	144			
74	246	134	43	174	128	230	50	216	154	26	168	79	184				
176	30	98	219	86	34	139	195	101	56	241	127	213	37				
69	148	196	2	159	247	89	11	136	185	92	14	108					
187	41	126	226	106	57	190	115	235	36	208	121	229					
81	214	92	53	145	204	27	166	74	157	82	165	31					
232	21	170	240	13	132	252	51	222	4	245	48						
130	155	55	115	183	78	122	196	102	180	65	173						
72	252	100	211	45	231	20	148	39	133	205							
202	32	179	5	163	95	191	86	239	111	29							
104	143	58	243	70	218	63	161	9	209								
64	236	129	110	151	25	199	49	172	68								
171	17	208	38	225	131	99	254	113									
80	191	87	174	76	189	13	143										
247	35	152	2	248	55												
140	108	197	127	96													
13	215	46	229														
164	90	180															
52	253																
205																	

Fig.7

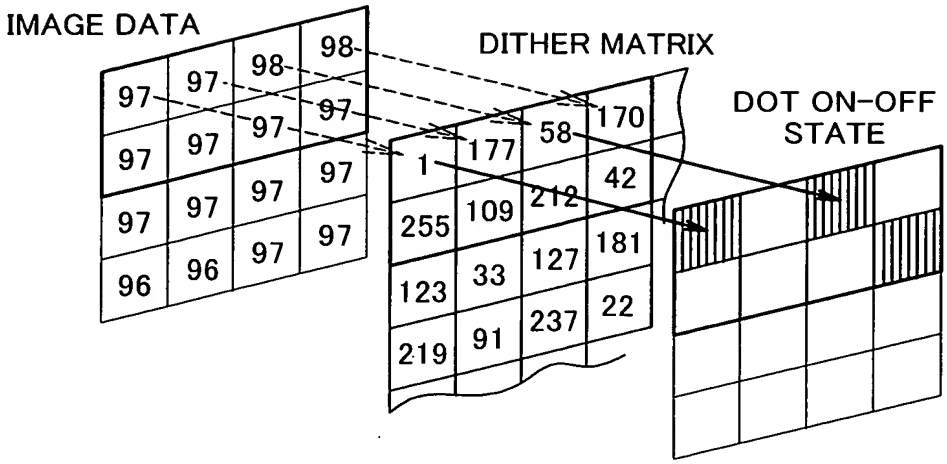


IMAGE DATA
DITHER MATRIX
DOT ON-OFF STATE
97 97 98 98
97 97 97 97
97 97 97 97
96 96 97 97
1 177 58 170
255 109 212 42
123 33 127 181
219 91 237 22

Fig.8a

97	97	98	98	98	98	98	98
97	97	97	97	97	97	98	98
97	97	97	97	97	97	97	97
96	96	97	97	97	97	97	97

Fig.8b

1	177	58	170	70	186	79	161
255	109	212	42	242	5	223	48
123	33	127	181	83	155	105	140
219	91	237	22	121	198	61	188

Fig.8c

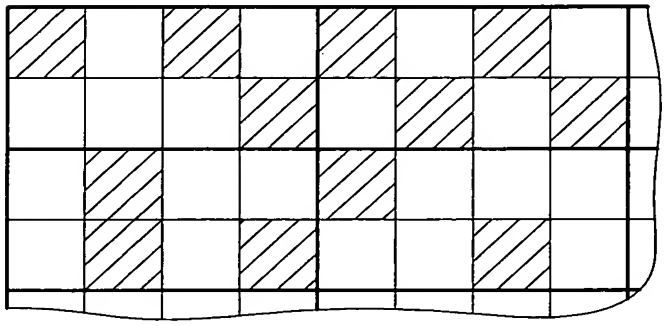


Fig.8d

3	4
3	2

Fig.9a

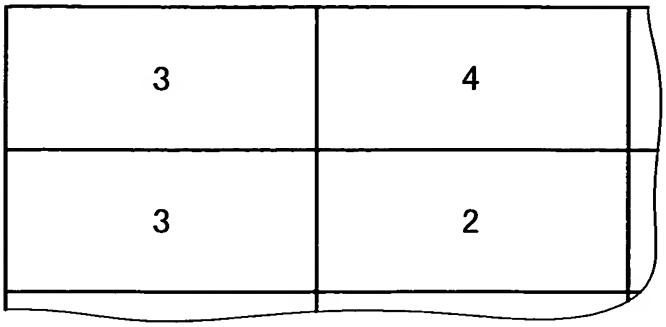


Fig.9b

1	177	58	170	70	186	79	161
255	109	212	42	242	5	223	48
123	33	127	181	83	155	105	140
219	91	237	22	121	198	61	188

Fig.9c

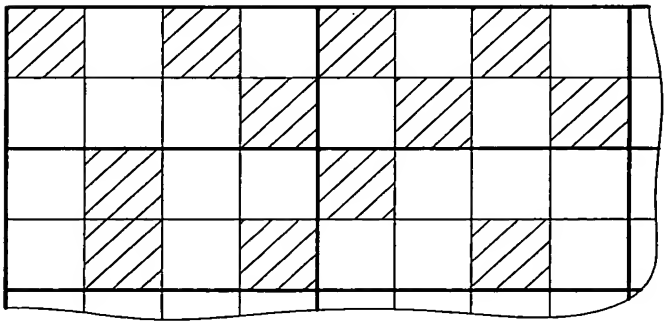


Fig.9d

1	6	3	5	3	6	4	5
8	4	7	2	8	1	7	2
4	2	5	6	2	6	3	5
7	3	8	1	4	8	1	7

Fig.10

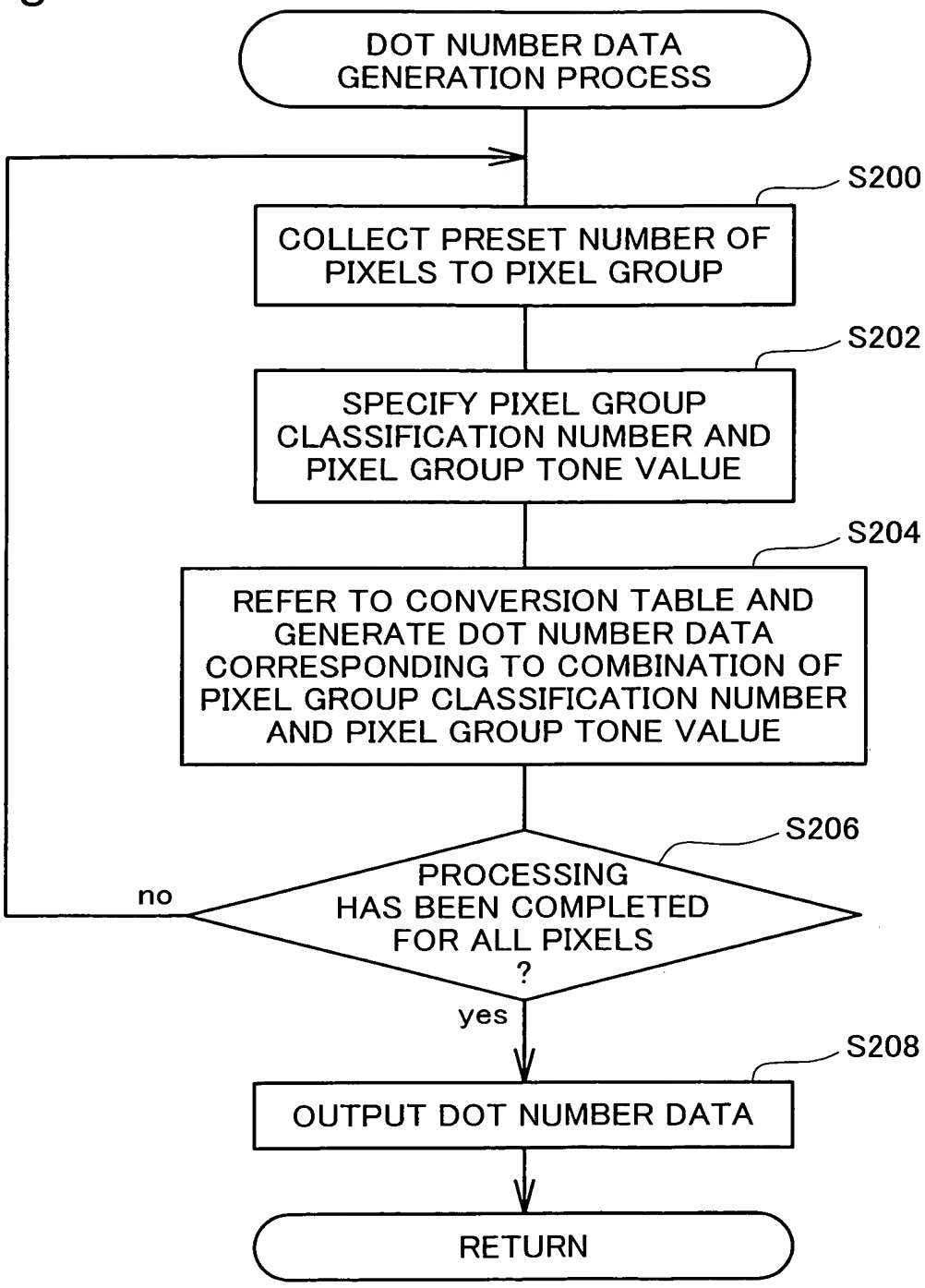

DOT NUMBER DATA GENERATION PROCESS
S200
COLLECT PRESET NUMBER OF PIXELS TO PIXEL GROUP
S202
SPECIFY PIXEL GROUP CLASSIFICATION NUMBER AND PIXEL GROUP TONE VALUE
S204
REFER TO CONVERSION TABLE AND GENERATE DOT NUMBER DATA CORRESPONDING TO COMBINATION OF PIXEL GROUP CLASSIFICATION NUMBER AND PIXEL GROUP TONE VALUE
S206
PROCESSING HAS BEEN COMPLETED FOR ALL PIXELS ?
no
yes
S208
OUTPUT DOT NUMBER DATA
RETURN

Fig.11a

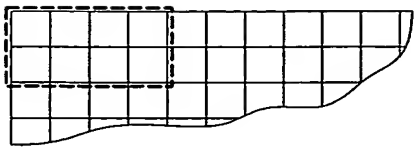


Fig.11b

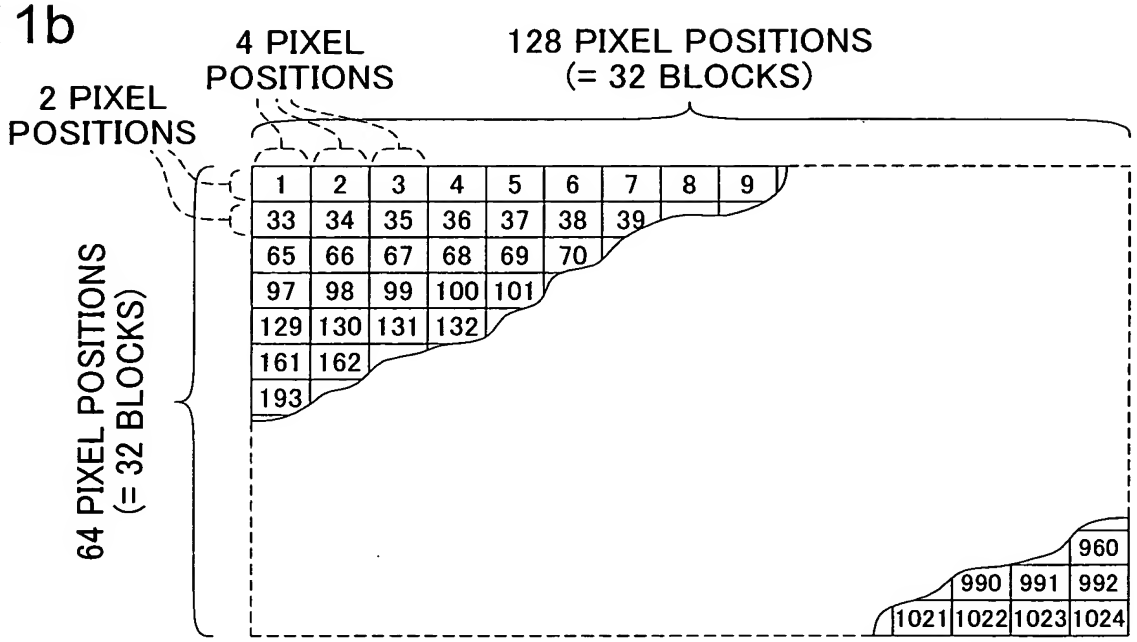


Fig.11c

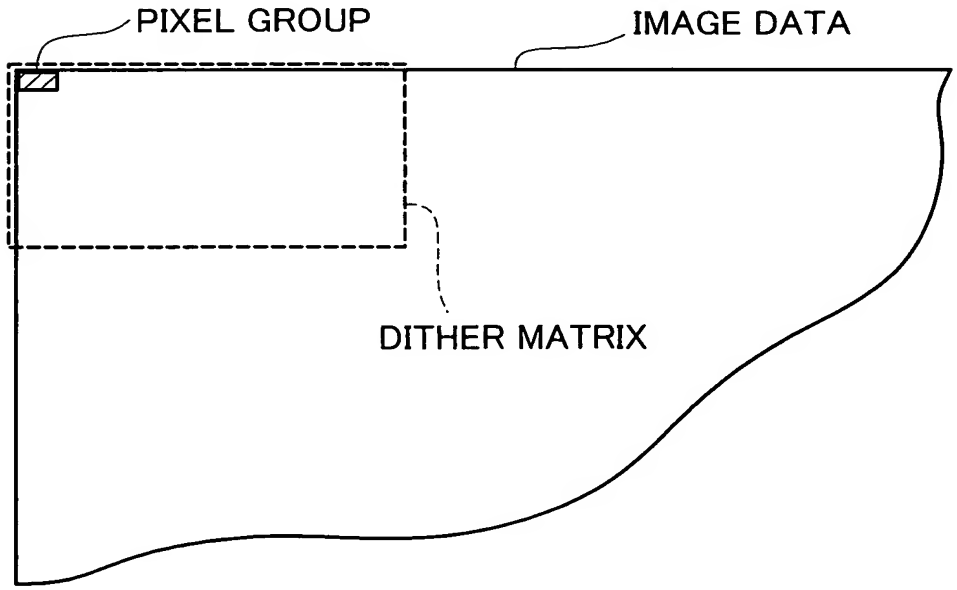


Fig.12a

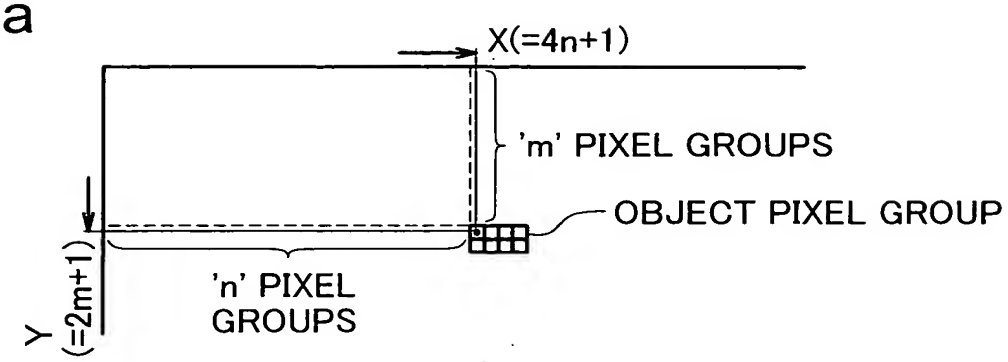


Fig.12b

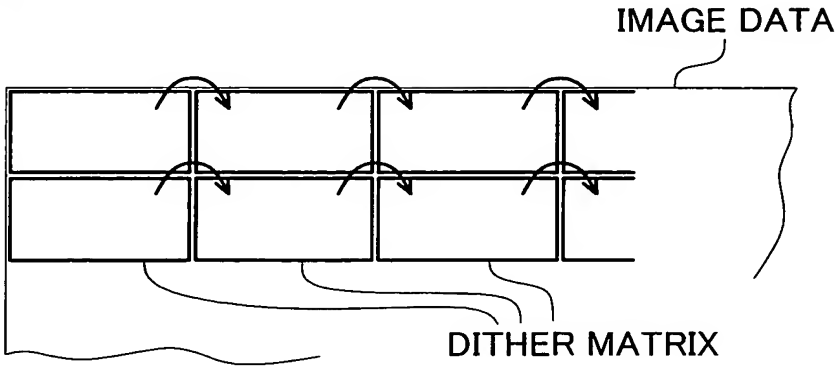


Fig.12c

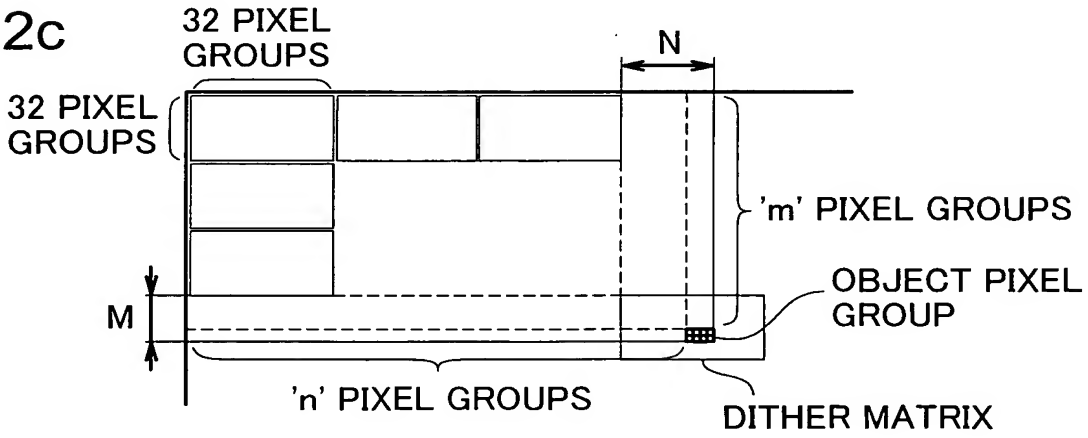


Fig.12d

$$\begin{cases} N = n - \mathrm{int}(n/32) \times 32 + 1 \\ M = m - \mathrm{int}(m/32) \times 32 + 1 \end{cases}$$

Fig.13

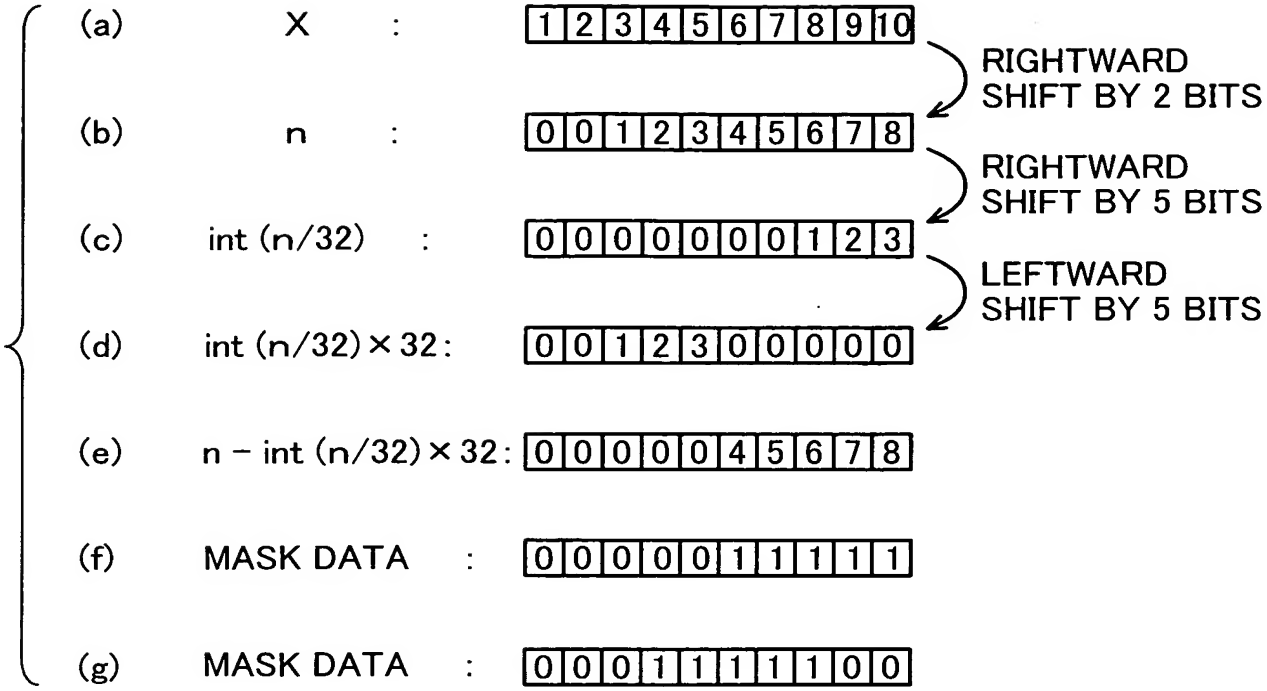

(a) X : 1 2 3 4 5 6 7 8 9 10
RIGHTWARD SHIFT BY 2 BITS
(b) n : 0 0 1 2 3 4 5 6 7 8
RIGHTWARD SHIFT BY 5 BITS
(c) int (n/32) : 0 0 0 0 0 0 0 1 2 3
LEFTWARD SHIFT BY 5 BITS
(d) int (n/32) × 32 : 0 0 1 2 3 0 0 0 0 0
(e) n − int (n/32) × 32 : 0 0 0 0 0 4 5 6 7 8
(f) MASK DATA : 0 0 0 0 0 1 1 1 1 1
(g) MASK DATA : 0 0 0 1 1 1 1 1 0 0

Fig.14

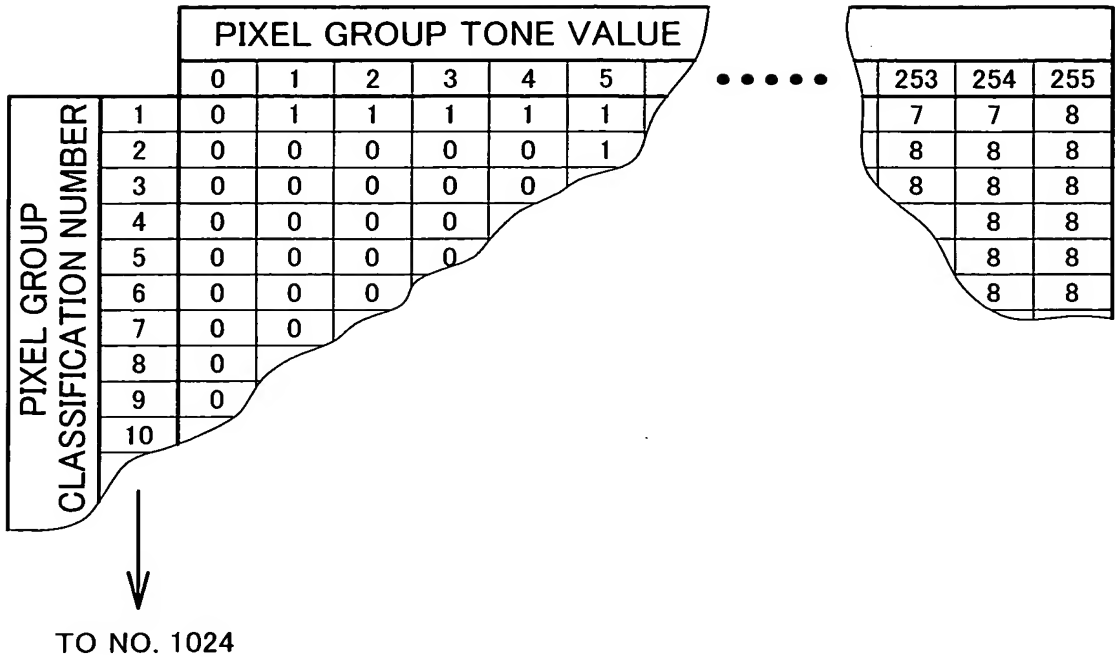
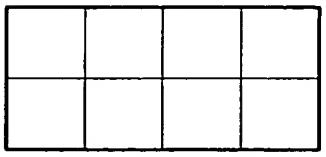

PIXEL GROUP TONE VALUE
0
1
2
3
4
5
253
254
255
PIXEL GROUP CLASSIFICATION NUMBER
1 0 1 1 1 1 1 7 7 8
2 0 0 0 0 0 1 8 8 8
3 0 0 0 0 0 8 8 8
4 0 0 0 0 8 8
5 0 0 0 0 8 8
6 0 0 0 8 8
7 0 0
8 0
9 0
10
TO NO. 1024

Fig.15

(a) BLOCK 1

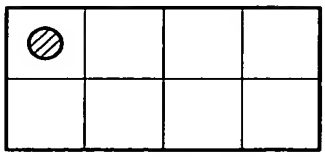
1	177	58	170
255	109	212	42

(b) PIXEL GROUP
TONE VALUE : 0



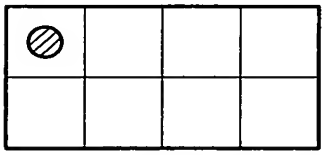
DOT NUMBER DATA : 0

(c) PIXEL GROUP
TONE VALUE : 1



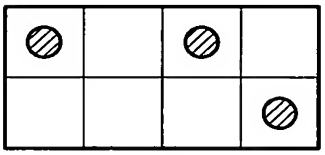
DOT NUMBER DATA : 1

(d) PIXEL GROUP
TONE VALUE : 2



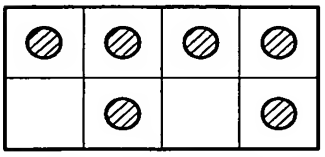
DOT NUMBER DATA : 1

(e) PIXEL GROUP
TONE VALUE : 100



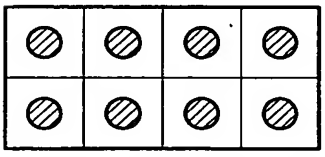
DOT NUMBER DATA : 3

(f) PIXEL GROUP
TONE VALUE : 200



DOT NUMBER DATA : 6

(g) PIXEL GROUP
TONE VALUE : 255



DOT NUMBER DATA : 8

Fig.16

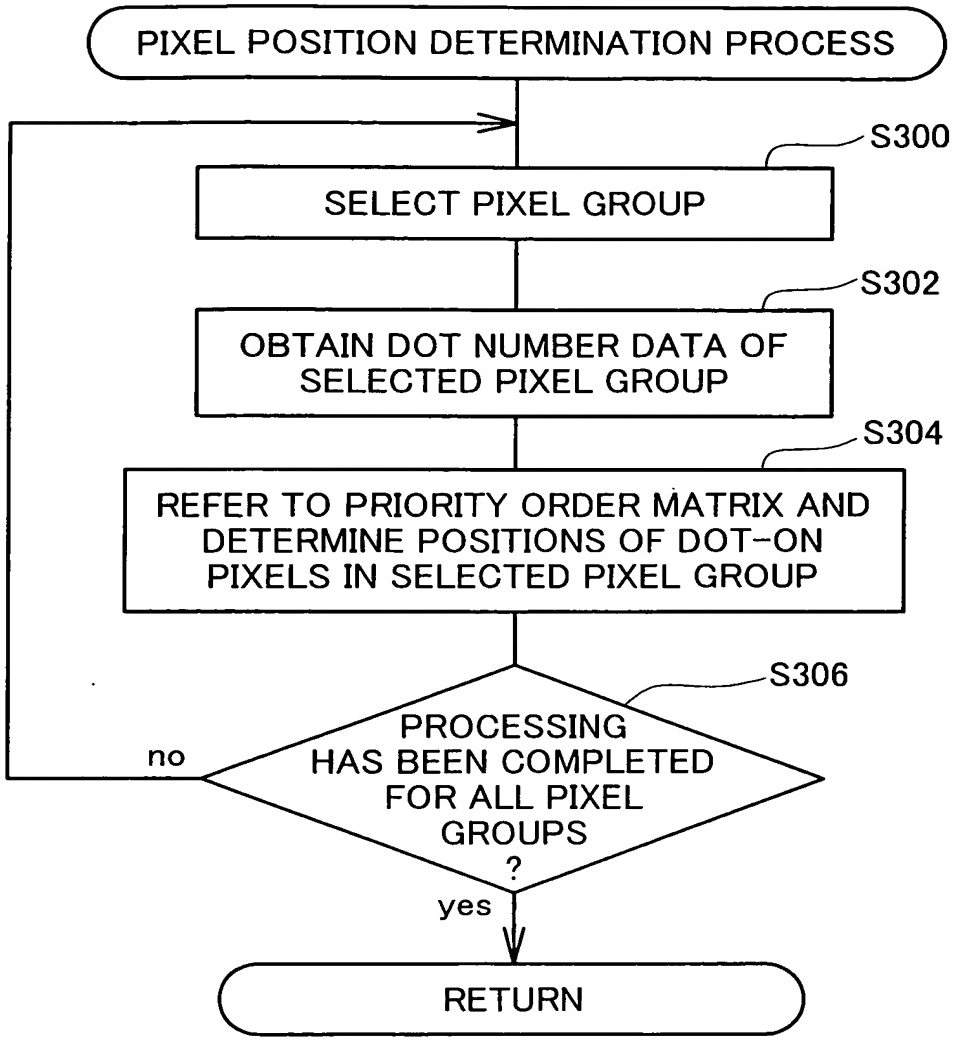

PIXEL POSITION DETERMINATION PROCESS
S300
SELECT PIXEL GROUP
S302
OBTAIN DOT NUMBER DATA OF SELECTED PIXEL GROUP
S304
REFER TO PRIORITY ORDER MATRIX AND DETERMINE POSITIONS OF DOT-ON PIXELS IN SELECTED PIXEL GROUP
S306
PROCESSING HAS BEEN COMPLETED FOR ALL PIXEL GROUPS ?
no
yes
RETURN

Fig.17

SIZE OF DITHER MATRIX (PIXELS)		SIZE OF PIXEL GROUP (PIXELS)		BLOCK NUMBER	DATA VOLUME OF CONVERSION TABLE (BYTES)	NUMBER OF STATES / PIXEL GROUP	NUMBER OF USED BITS
MAIN SCANNING DIRECTION	SUB-SCANNING DIRECTION	MAIN SCANNING DIRECTION	SUB-SCANNING DIRECTION				
64	64	2	2	1024	256K	5	3
		4	2	512	128K	9	4
		4	4	256	64K	17	5
128	64	2	2	2048	512K	5	3
		4	2	1024	256K	9	4
		4	4	512	128K	17	5
128	128	2	2	4096	1024K	5	3
		4	2	2048	512K	9	4
		4	4	1024	256K	17	5

Fig.18

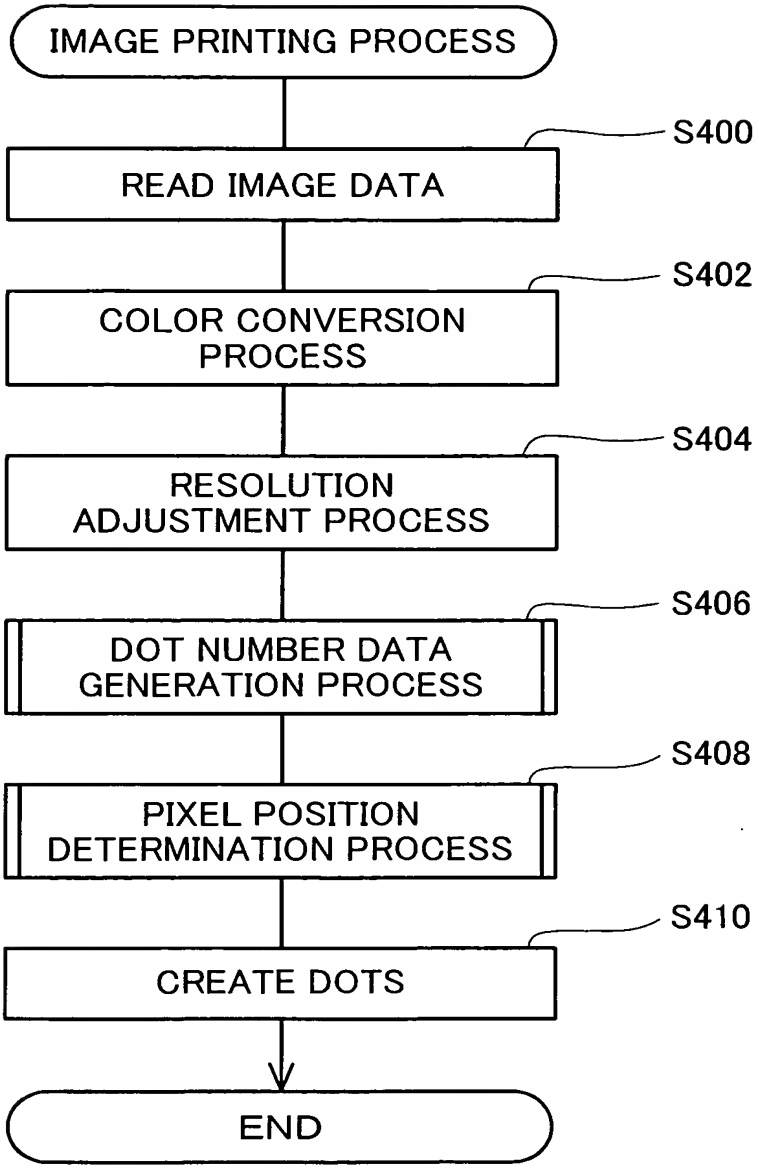


IMAGE PRINTING PROCESS
S400
READ IMAGE DATA
S402
COLOR CONVERSION PROCESS
S404
RESOLUTION ADJUSTMENT PROCESS
S406
DOT NUMBER DATA GENERATION PROCESS
S408
PIXEL POSITION DETERMINATION PROCESS
S410
CREATE DOTS
END

Fig.19a

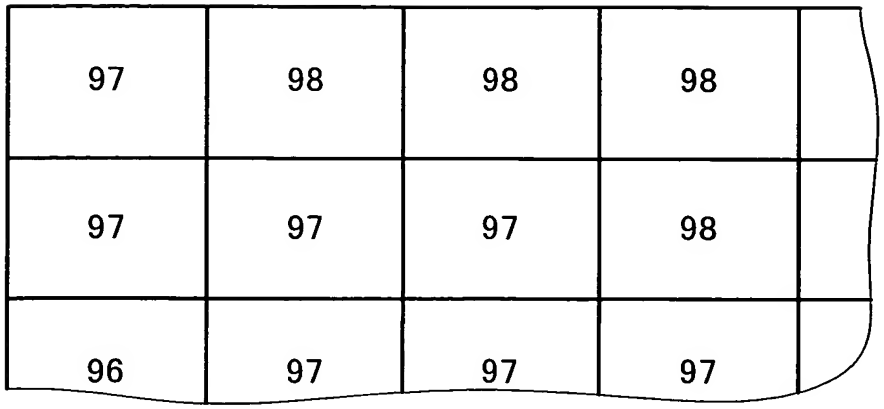


Fig.19b

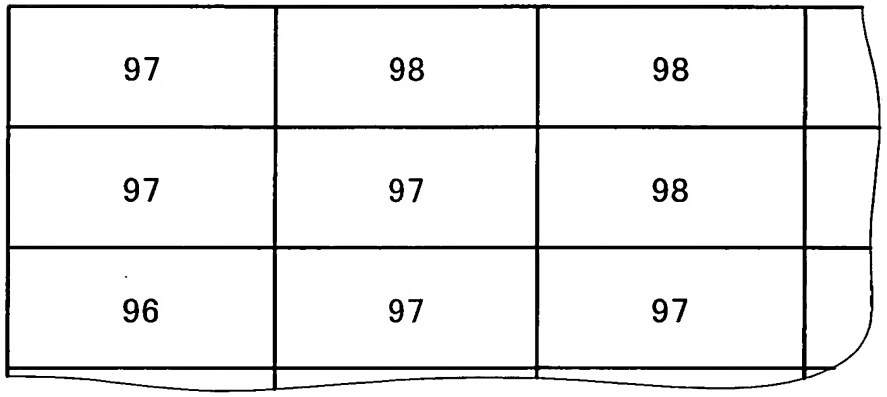


Fig.19c

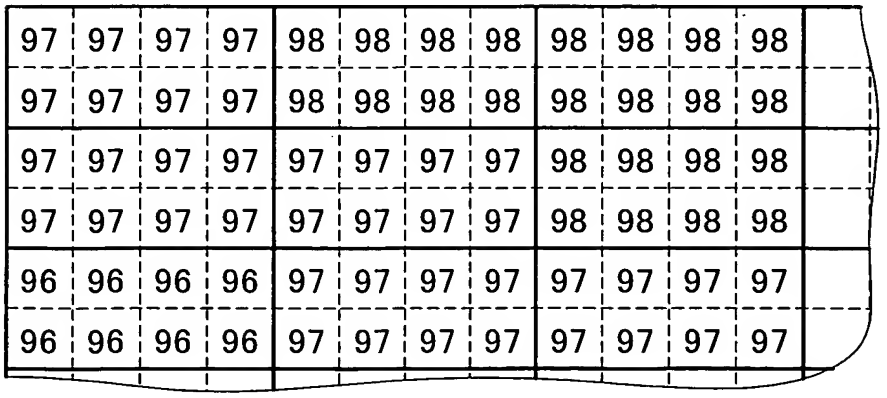


Fig.20

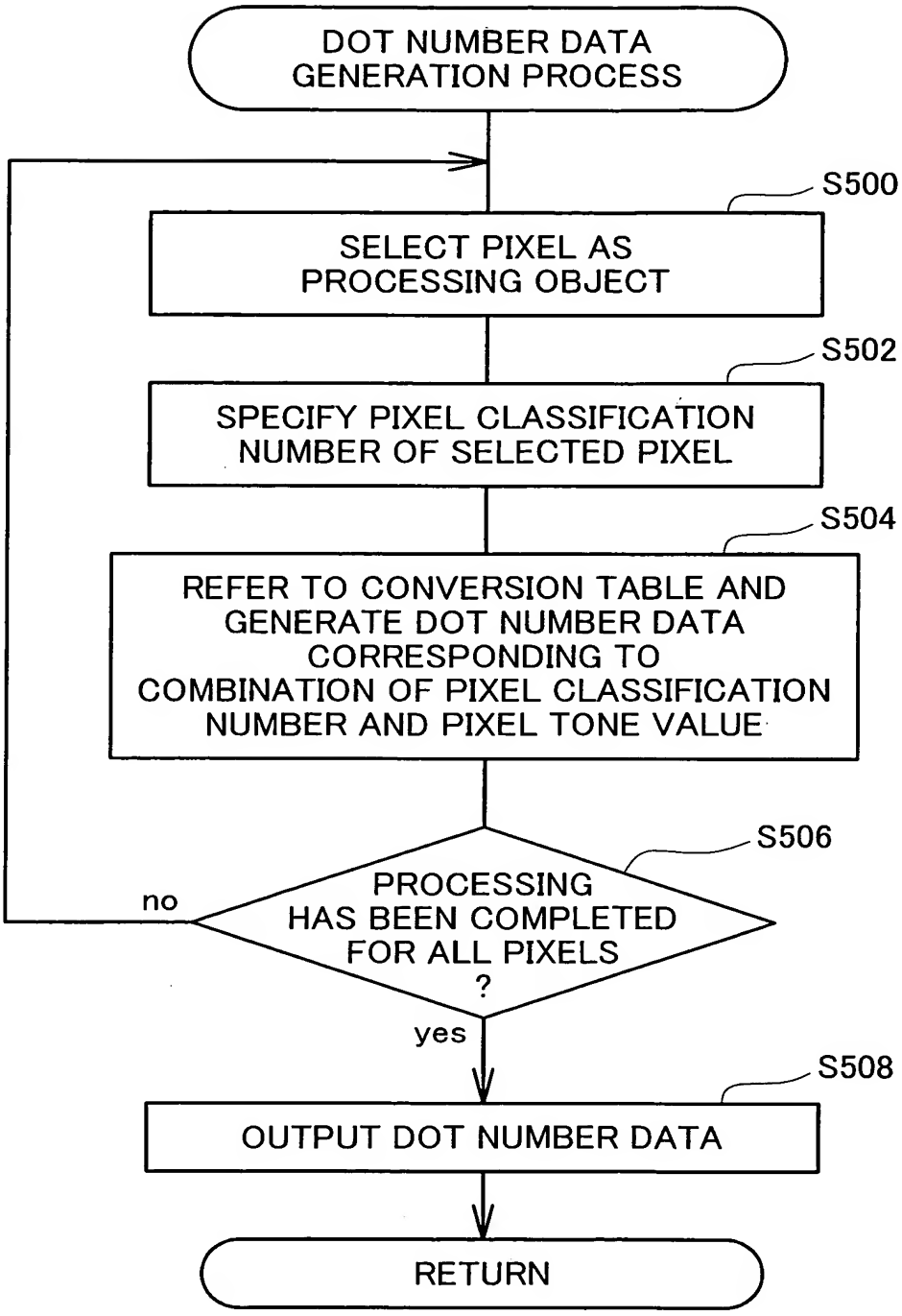

DOT NUMBER DATA GENERATION PROCESS
S500
SELECT PIXEL AS PROCESSING OBJECT
S502
SPECIFY PIXEL CLASSIFICATION NUMBER OF SELECTED PIXEL
S504
REFER TO CONVERSION TABLE AND GENERATE DOT NUMBER DATA CORRESPONDING TO COMBINATION OF PIXEL CLASSIFICATION NUMBER AND PIXEL TONE VALUE
S506
PROCESSING HAS BEEN COMPLETED FOR ALL PIXELS ?
no
yes
S508
OUTPUT DOT NUMBER DATA
RETURN

Fig.21

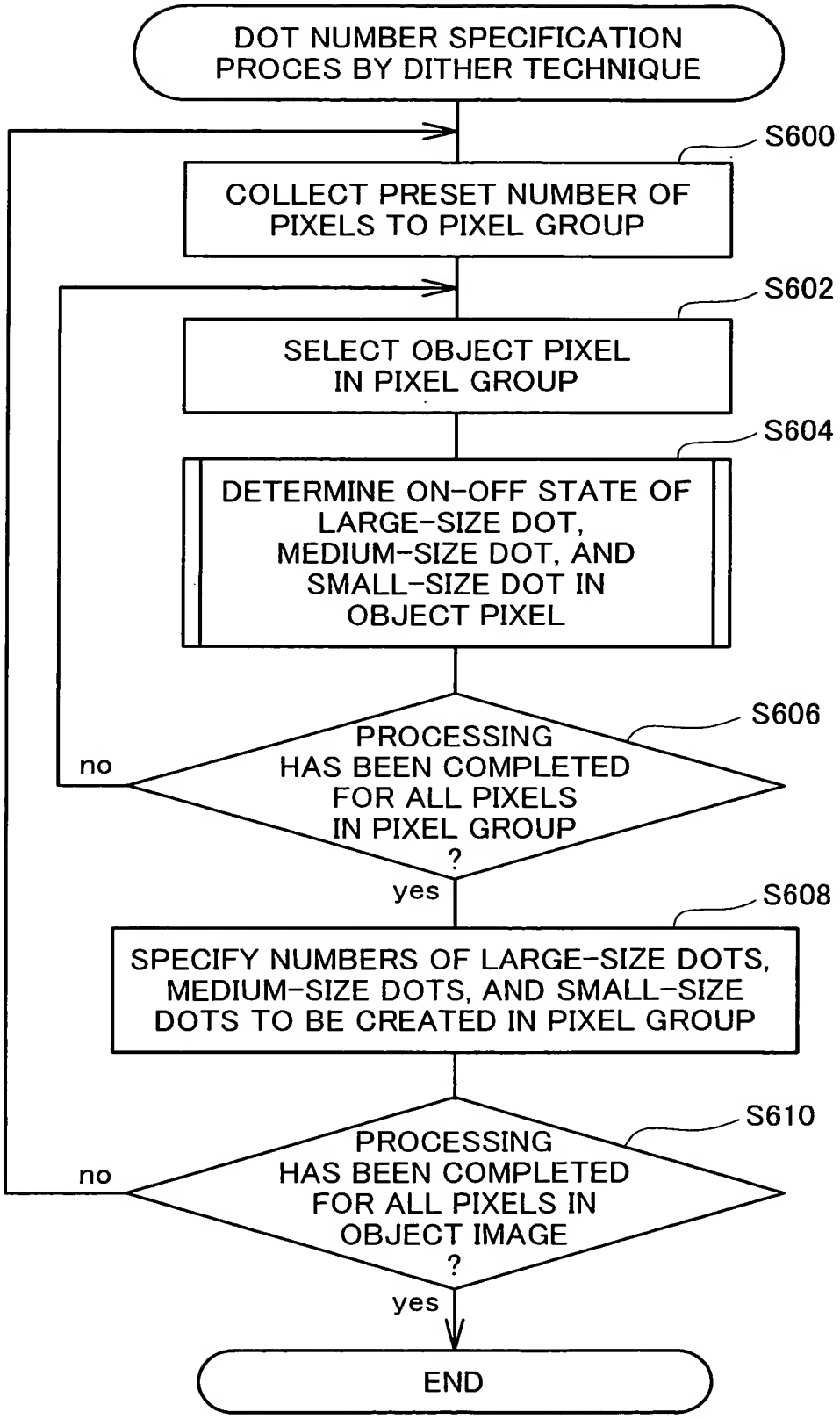

DOT NUMBER SPECIFICATION PROCES BY DITHER TECHNIQUE
S600
COLLECT PRESET NUMBER OF PIXELS TO PIXEL GROUP
S602
SELECT OBJECT PIXEL IN PIXEL GROUP
S604
DETERMINE ON-OFF STATE OF LARGE-SIZE DOT, MEDIUM-SIZE DOT, AND SMALL-SIZE DOT IN OBJECT PIXEL
S606
PROCESSING HAS BEEN COMPLETED FOR ALL PIXELS IN PIXEL GROUP ?
no
yes
S608
SPECIFY NUMBERS OF LARGE-SIZE DOTS, MEDIUM-SIZE DOTS, AND SMALL-SIZE DOTS TO BE CREATED IN PIXEL GROUP
S610
PROCESSING HAS BEEN COMPLETED FOR ALL PIXELS IN OBJECT IMAGE ?
no
yes
END

Fig.22

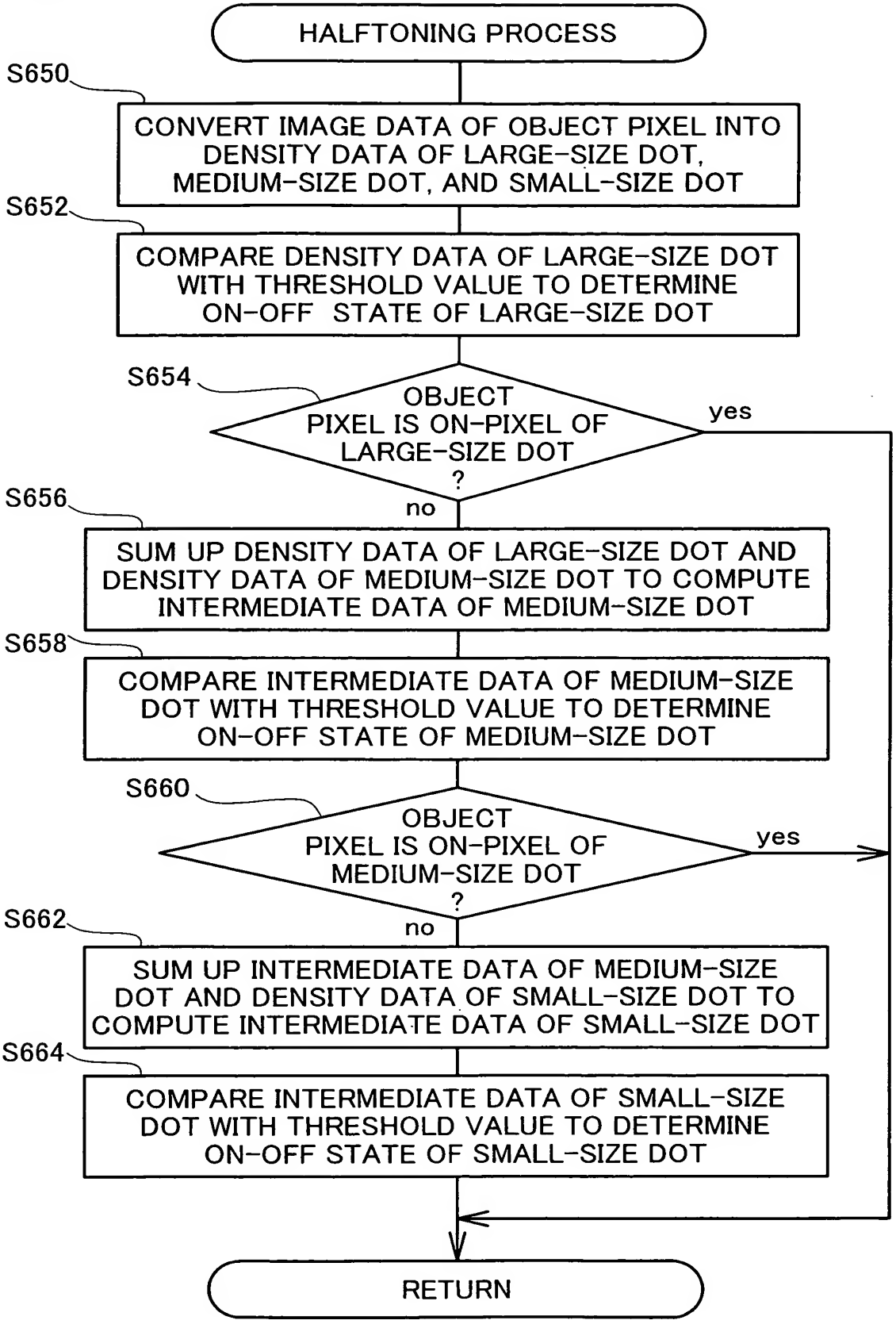

HALFTONING PROCESS
S650
CONVERT IMAGE DATA OF OBJECT PIXEL INTO DENSITY DATA OF LARGE-SIZE DOT, MEDIUM-SIZE DOT, AND SMALL-SIZE DOT
S652
COMPARE DENSITY DATA OF LARGE-SIZE DOT WITH THRESHOLD VALUE TO DETERMINE ON-OFF STATE OF LARGE-SIZE DOT
S654
OBJECT PIXEL IS ON-PIXEL OF LARGE-SIZE DOT ?
yes
no
S656
SUM UP DENSITY DATA OF LARGE-SIZE DOT AND DENSITY DATA OF MEDIUM-SIZE DOT TO COMPUTE INTERMEDIATE DATA OF MEDIUM-SIZE DOT
S658
COMPARE INTERMEDIATE DATA OF MEDIUM-SIZE DOT WITH THRESHOLD VALUE TO DETERMINE ON-OFF STATE OF MEDIUM-SIZE DOT
S660
OBJECT PIXEL IS ON-PIXEL OF MEDIUM-SIZE DOT ?
yes
no
S662
SUM UP INTERMEDIATE DATA OF MEDIUM-SIZE DOT AND DENSITY DATA OF SMALL-SIZE DOT TO COMPUTE INTERMEDIATE DATA OF SMALL-SIZE DOT
S664
COMPARE INTERMEDIATE DATA OF SMALL-SIZE DOT WITH THRESHOLD VALUE TO DETERMINE ON-OFF STATE OF SMALL-SIZE DOT
RETURN

Fig.23

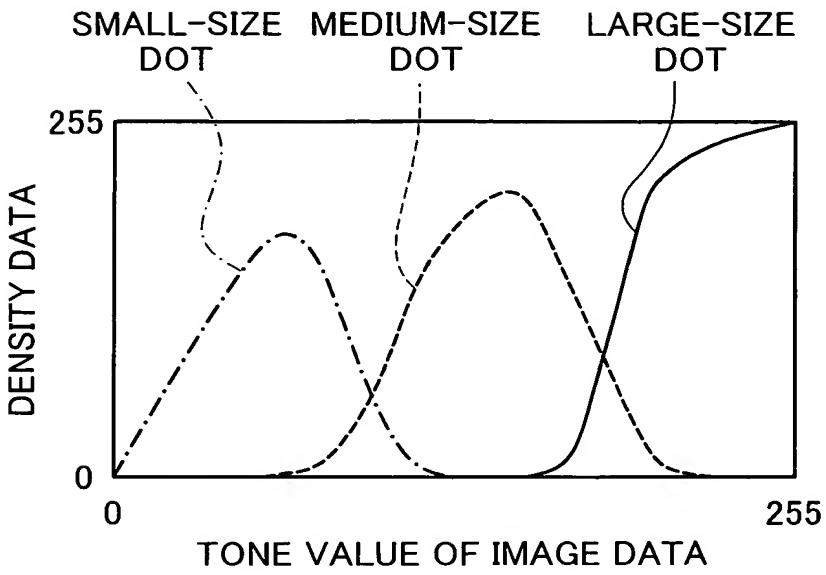

SMALL-SIZE DOT
MEDIUM-SIZE DOT
LARGE-SIZE DOT
255
0
DENSITY DATA
0
255
TONE VALUE OF IMAGE DATA

Fig.24

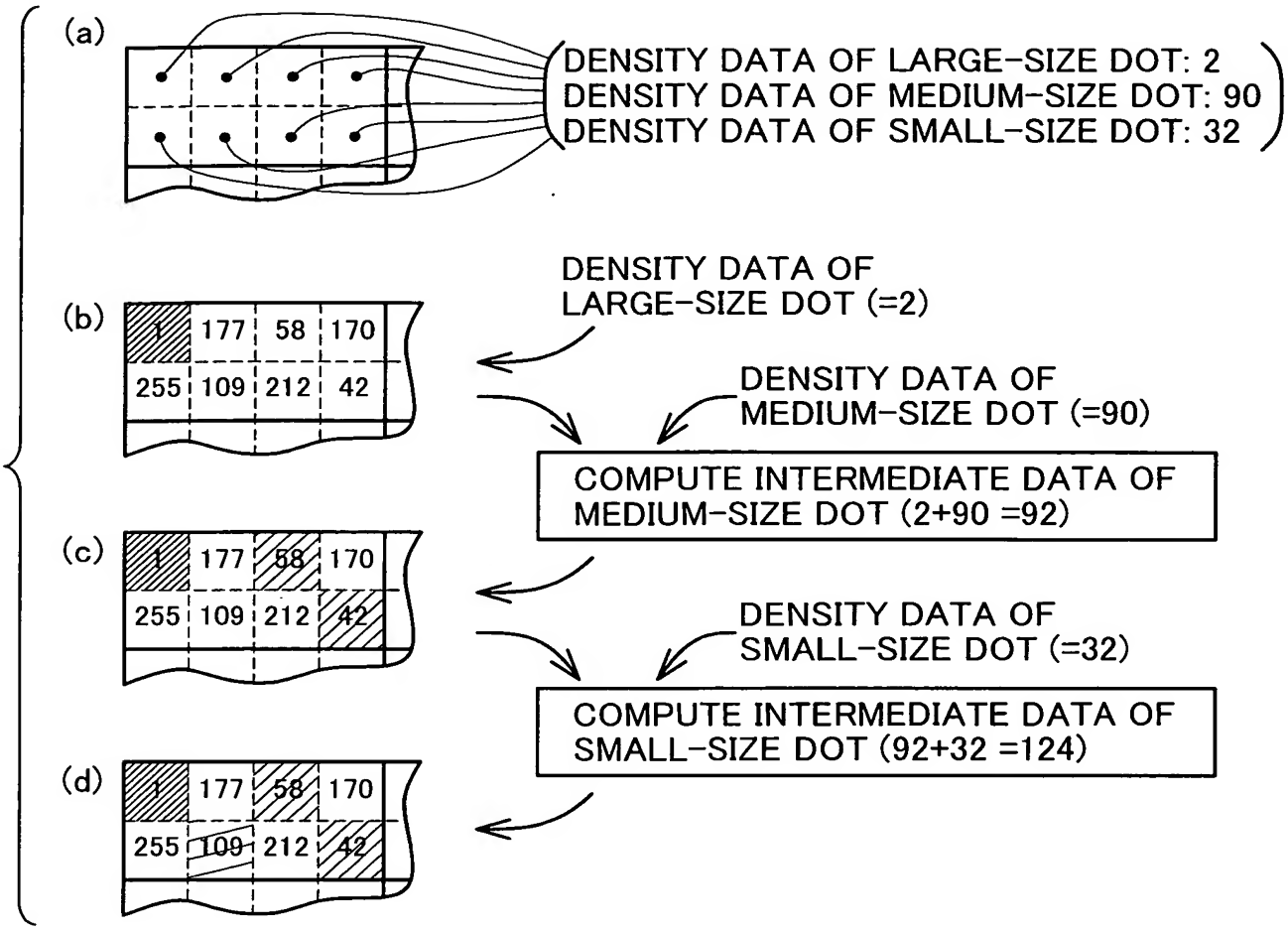

(a)
DENSITY DATA OF LARGE-SIZE DOT: 2
DENSITY DATA OF MEDIUM-SIZE DOT: 90
DENSITY DATA OF SMALL-SIZE DOT: 32
(b)
1 177 58 170
255 109 212 42
DENSITY DATA OF LARGE-SIZE DOT (=2)
DENSITY DATA OF MEDIUM-SIZE DOT (=90)
COMPUTE INTERMEDIATE DATA OF MEDIUM-SIZE DOT (2+90 =92)
(c)
1 177 58 170
255 109 212 42
DENSITY DATA OF SMALL-SIZE DOT (=32)
COMPUTE INTERMEDIATE DATA OF SMALL-SIZE DOT (92+32 =124)
(d)
1 177 58 170
255 109 212 42

Fig.25

(LARGE, MEDIUM, SMALL) = (1,2,1)	(0,4,0)	(0,3,1)	
(0,3,0)	(0,2,1)	(1,1,0)	
(0,2,3)	(1,2,1)	(0,3,0)	

Fig.26

NUMBERS OF DOTS			ENCODED DOT NUMBER DATA
LARGE-SIZE DOT	MEDIUM-SIZE DOT	SMALL-SIZE DOT	
0	0	0	0
0	0	1	1
0	0	2	2
0	0	3	3
6	2	0	160
7	0	0	161
7	0	1	162
7	1	0	163
8	0	0	164

Fig.27

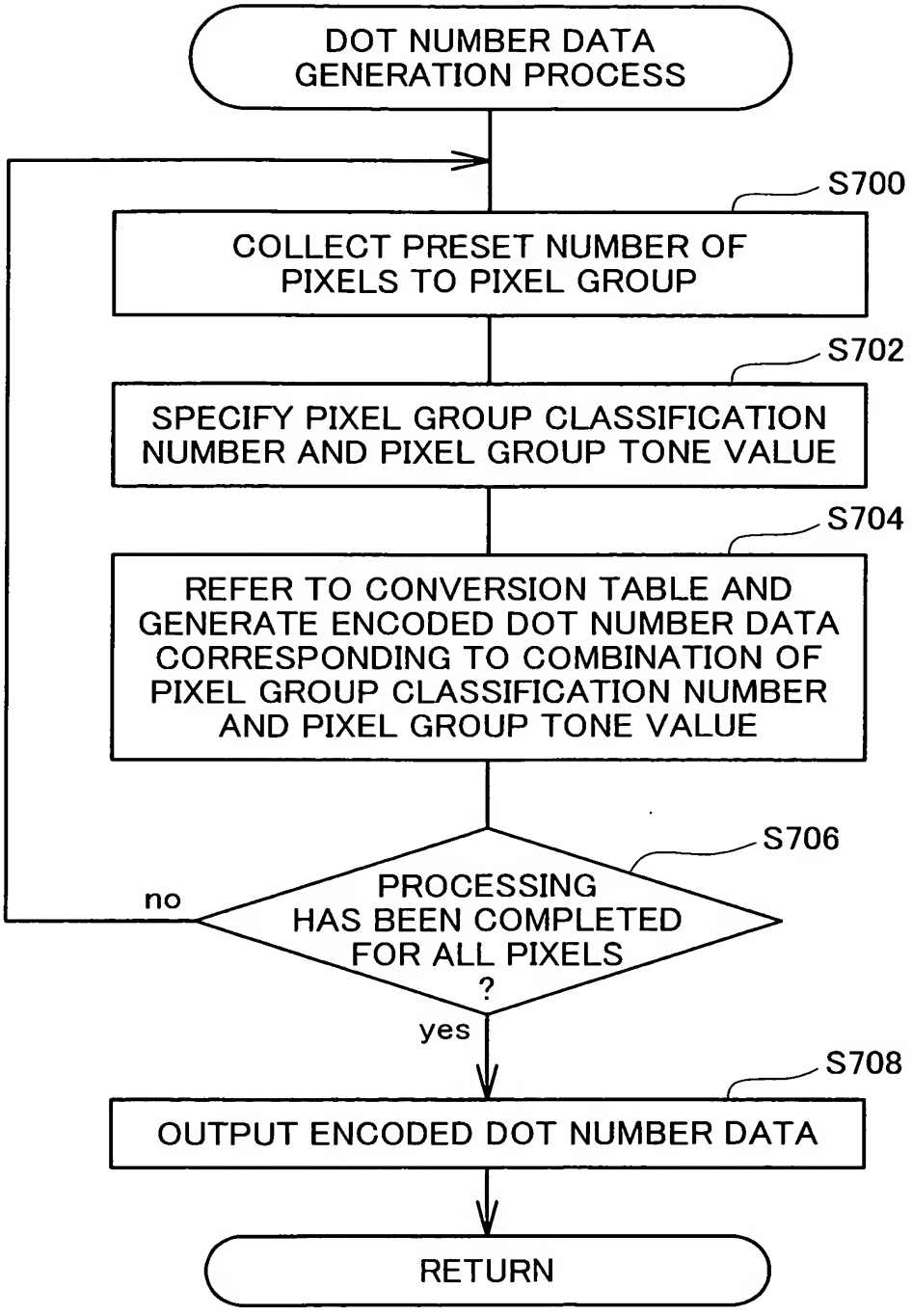

DOT NUMBER DATA GENERATION PROCESS
S700
COLLECT PRESET NUMBER OF PIXELS TO PIXEL GROUP
S702
SPECIFY PIXEL GROUP CLASSIFICATION NUMBER AND PIXEL GROUP TONE VALUE
S704
REFER TO CONVERSION TABLE AND GENERATE ENCODED DOT NUMBER DATA CORRESPONDING TO COMBINATION OF PIXEL GROUP CLASSIFICATION NUMBER AND PIXEL GROUP TONE VALUE
S706
PROCESSING HAS BEEN COMPLETED FOR ALL PIXELS ?
no
yes
S708
OUTPUT ENCODED DOT NUMBER DATA
RETURN

Fig.28

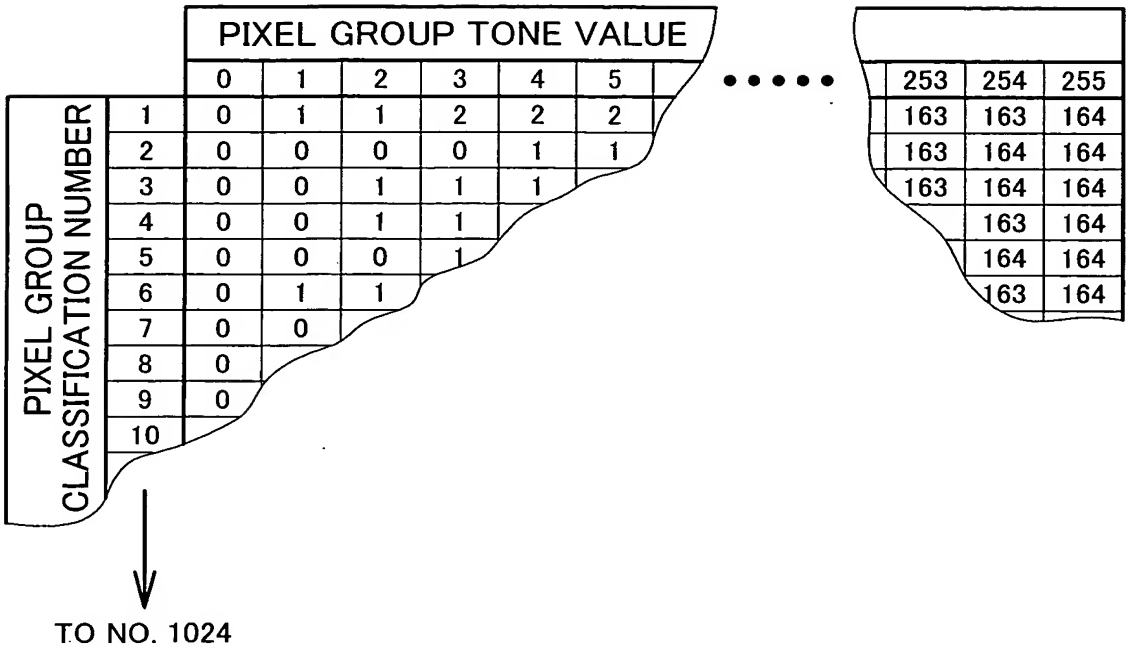

PIXEL GROUP TONE VALUE
PIXEL GROUP CLASSIFICATION NUMBER
0 1 2 3 4 5 ..... 253 254 255
1 0 1 1 2 2 2 ..... 163 163 164
2 0 0 0 0 1 1 ..... 163 164 164
3 0 0 1 1 1 ..... 163 164 164
4 0 0 1 1 ..... 163 164
5 0 0 0 1 ..... 164 164
6 0 1 1 ..... 163 164
7 0 0
8 0
9 0
10
TO NO. 1024

Fig.29

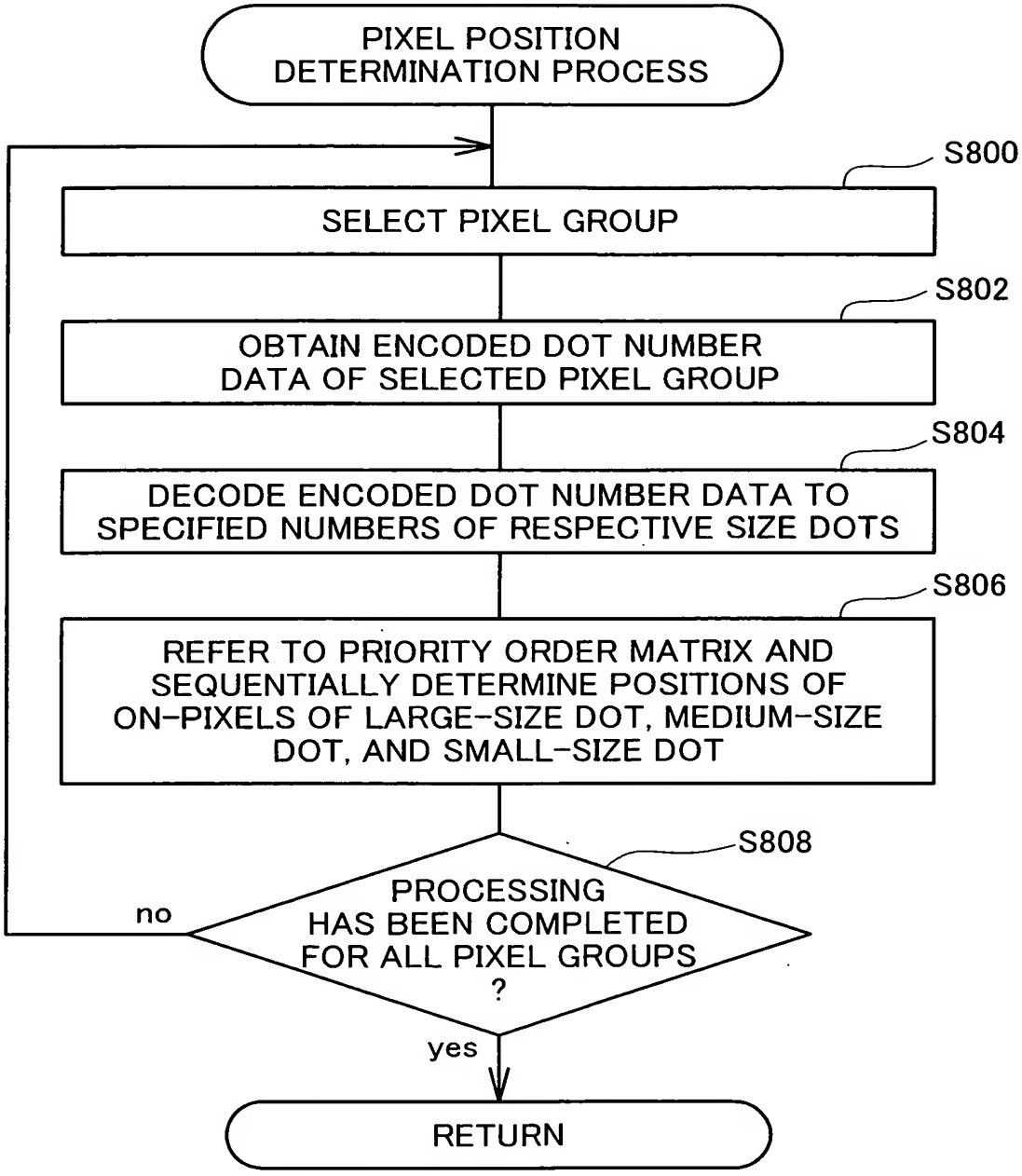

PIXEL POSITION DETERMINATION PROCESS
S800
SELECT PIXEL GROUP
S802
OBTAIN ENCODED DOT NUMBER DATA OF SELECTED PIXEL GROUP
S804
DECODE ENCODED DOT NUMBER DATA TO SPECIFIED NUMBERS OF RESPECTIVE SIZE DOTS
S806
REFER TO PRIORITY ORDER MATRIX AND SEQUENTIALLY DETERMINE POSITIONS OF ON-PIXELS OF LARGE-SIZE DOT, MEDIUM-SIZE DOT, AND SMALL-SIZE DOT
S808
PROCESSING HAS BEEN COMPLETED FOR ALL PIXEL GROUPS ?
no
yes
RETURN

Fig.30

ENCODED DOT NUMBER DATA	NUMBERS OF DOTS		
	LARGE-SIZE DOT	MEDIUM-SIZE DOT	SMALL-SIZE DOT
0	0	0	0
1	0	0	1
2	0	0	2
3	0	0	3
160	6	2	0
161	7	0	0
162	7	0	1
163	7	1	0
164	8	0	0

Fig.31

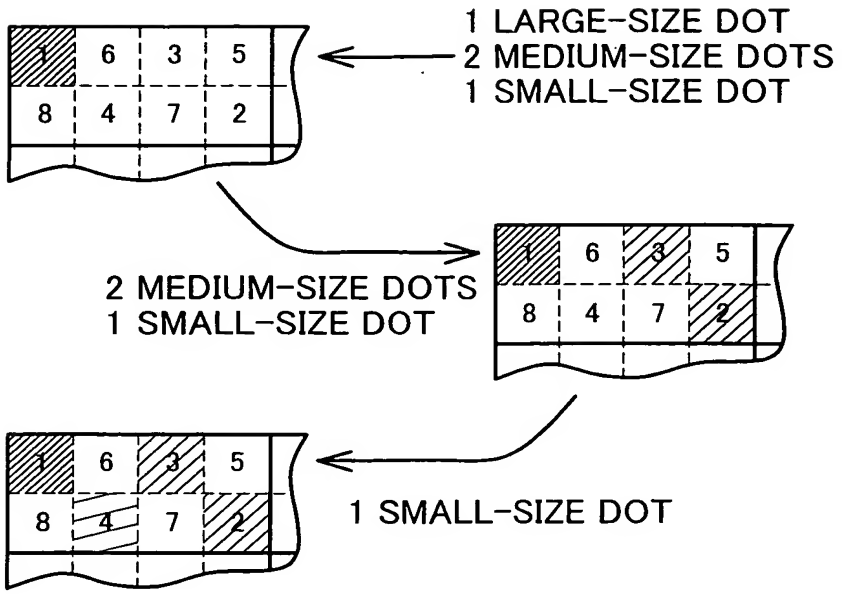

1 LARGE-SIZE DOT
2 MEDIUM-SIZE DOTS
1 SMALL-SIZE DOT
1 6 3 5
8 4 7 2
2 MEDIUM-SIZE DOTS
1 SMALL-SIZE DOT
1 6 3 5
8 4 7 2
1 SMALL-SIZE DOT
1 6 3 5
8 4 7 2

Fig.32

ENCODED DOT NUMBER DATA	NUMBERS OF DOTS		
	LARGE-SIZE DOT	LARGE-SIZE DOT + MEDIUM-SIZE DOT	LARGE-SIZE DOT + MEDIUM-SIZE DOT + SMALL-SIZE DOT
0	0	0	0
1	0	0	1
2	0	0	2
3	0	0	3
160	6	8	8
161	7	7	7
162	7	7	8
163	7	8	8
164	8	8	8

Fig.33

SIZE OF DITHER MATRIX		SIZE OF PIXEL GROUP (PIXELS)		BLOCK NUMBER	DATA VOLUME OF CONVERSION TABLE (BYTES)	NUMBER OF STATES / PIXEL GROUP	NUMBER OF USED BITS	DATA COMPRESSION RATE
MAIN SCANNING DIRECTION	SUB-SCANNING DIRECTION	MAIN SCANNING DIRECTION	SUB-SCANNING DIRECTION					
64	64	2	2	1024	256K	35	6	0.75
		4	2	512	128K	165	8	0.5
		4	4	256	128K	969	10	0.31
128	64	2	2	2048	512K	35	6	0.75
		4	2	1024	256K	165	8	0.5
		4	4	512	256K	969	10	0.31
128	128	2	2	4096	1024K	35	6	0.75
		4	2	2048	512K	165	8	0.5
		4	4	1024	512K	969	10	0.31

Fig.34

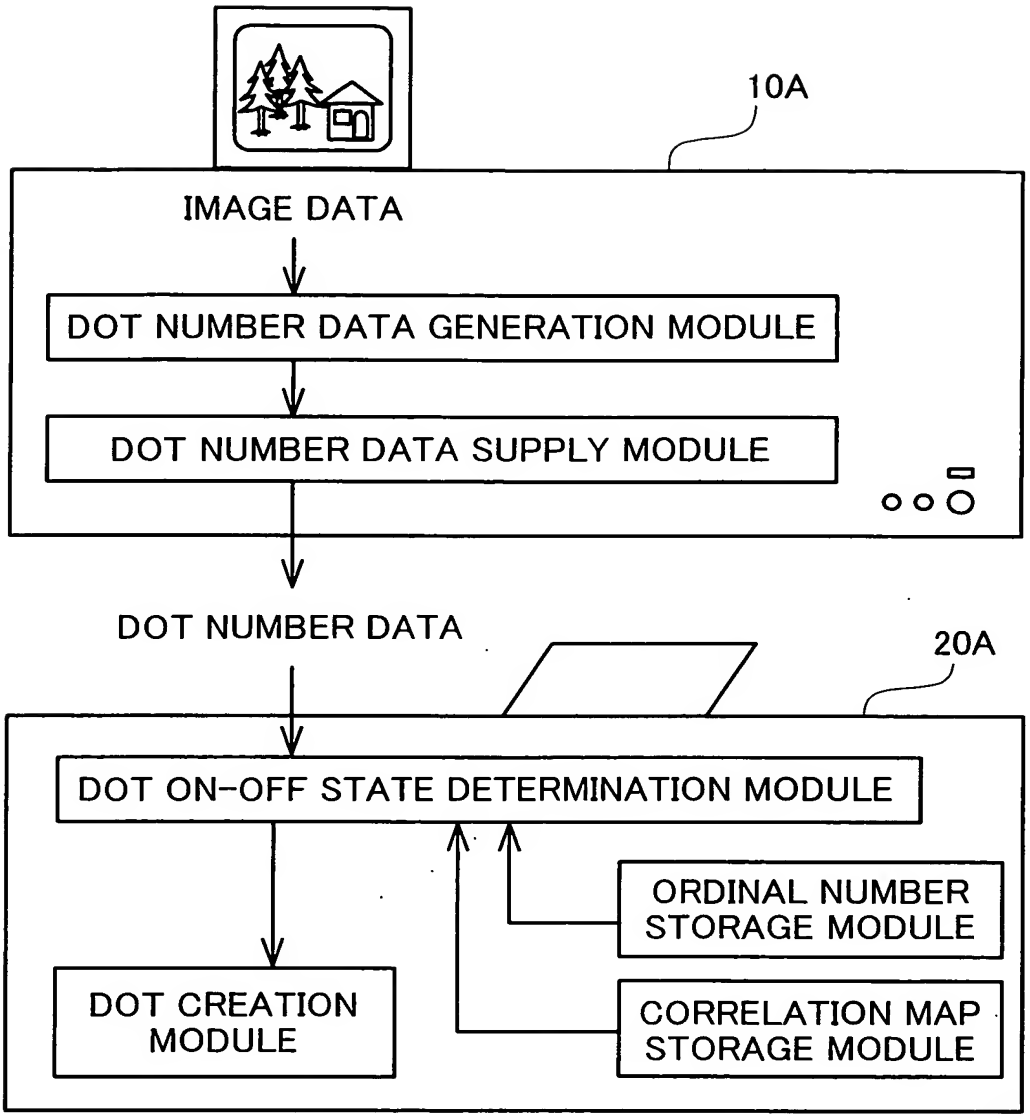

10A
IMAGE DATA
DOT NUMBER DATA GENERATION MODULE
DOT NUMBER DATA SUPPLY MODULE
DOT NUMBER DATA
20A
DOT ON-OFF STATE DETERMINATION MODULE
ORDINAL NUMBER STORAGE MODULE
DOT CREATION MODULE
CORRELATION MAP STORAGE MODULE

Fig.35

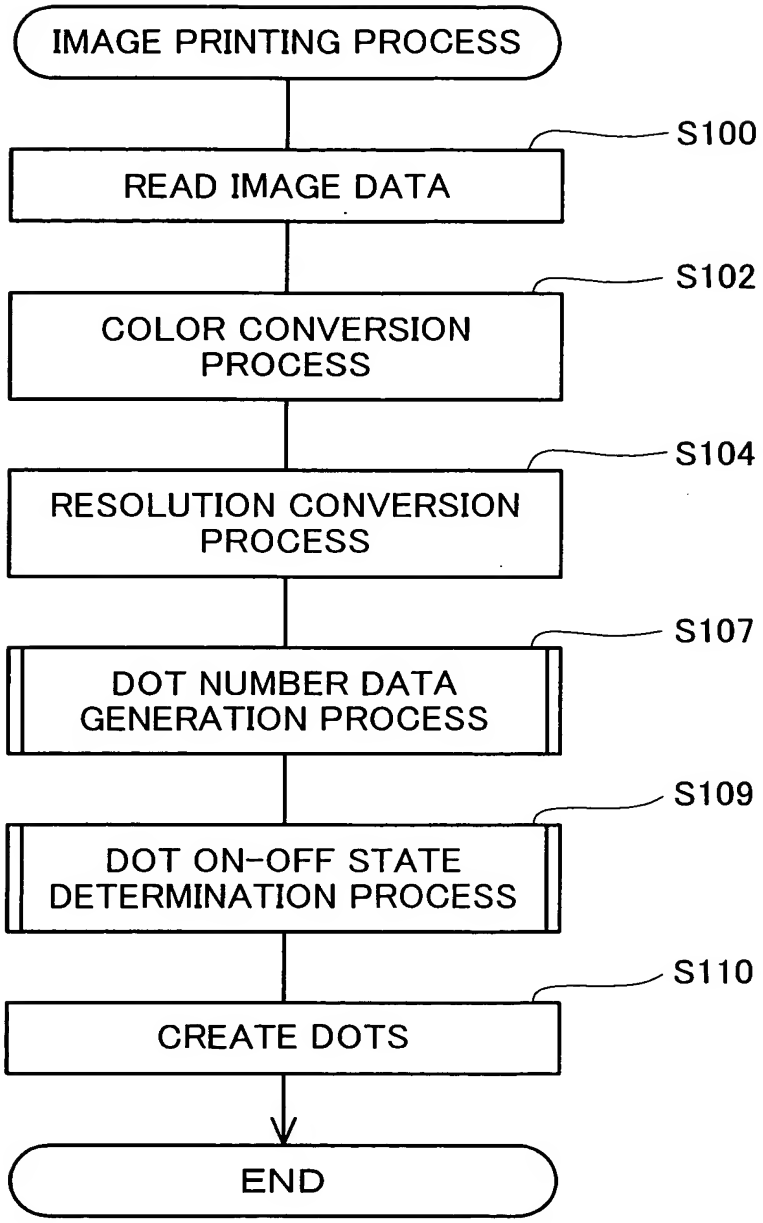


IMAGE PRINTING PROCESS
S100
READ IMAGE DATA
S102
COLOR CONVERSION PROCESS
S104
RESOLUTION CONVERSION PROCESS
S107
DOT NUMBER DATA GENERATION PROCESS
S109
DOT ON-OFF STATE DETERMINATION PROCESS
S110
CREATE DOTS
END

Fig.36

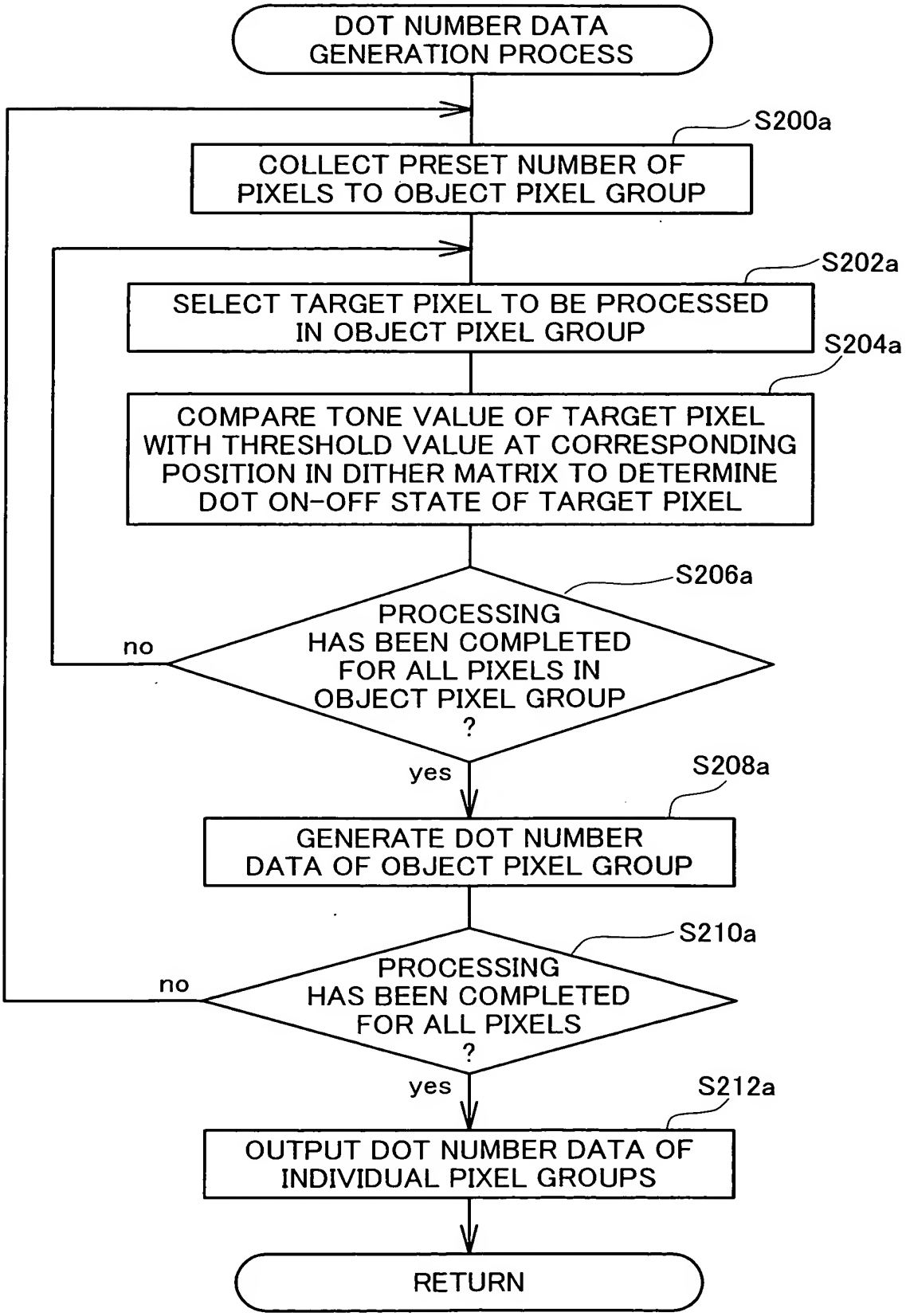

DOT NUMBER DATA GENERATION PROCESS
S200a
COLLECT PRESET NUMBER OF PIXELS TO OBJECT PIXEL GROUP
S202a
SELECT TARGET PIXEL TO BE PROCESSED IN OBJECT PIXEL GROUP
S204a
COMPARE TONE VALUE OF TARGET PIXEL WITH THRESHOLD VALUE AT CORRESPONDING POSITION IN DITHER MATRIX TO DETERMINE DOT ON-OFF STATE OF TARGET PIXEL
S206a
PROCESSING HAS BEEN COMPLETED FOR ALL PIXELS IN OBJECT PIXEL GROUP ?
no
yes
S208a
GENERATE DOT NUMBER DATA OF OBJECT PIXEL GROUP
S210a
PROCESSING HAS BEEN COMPLETED FOR ALL PIXELS ?
no
yes
S212a
OUTPUT DOT NUMBER DATA OF INDIVIDUAL PIXEL GROUPS
RETURN

Fig.37

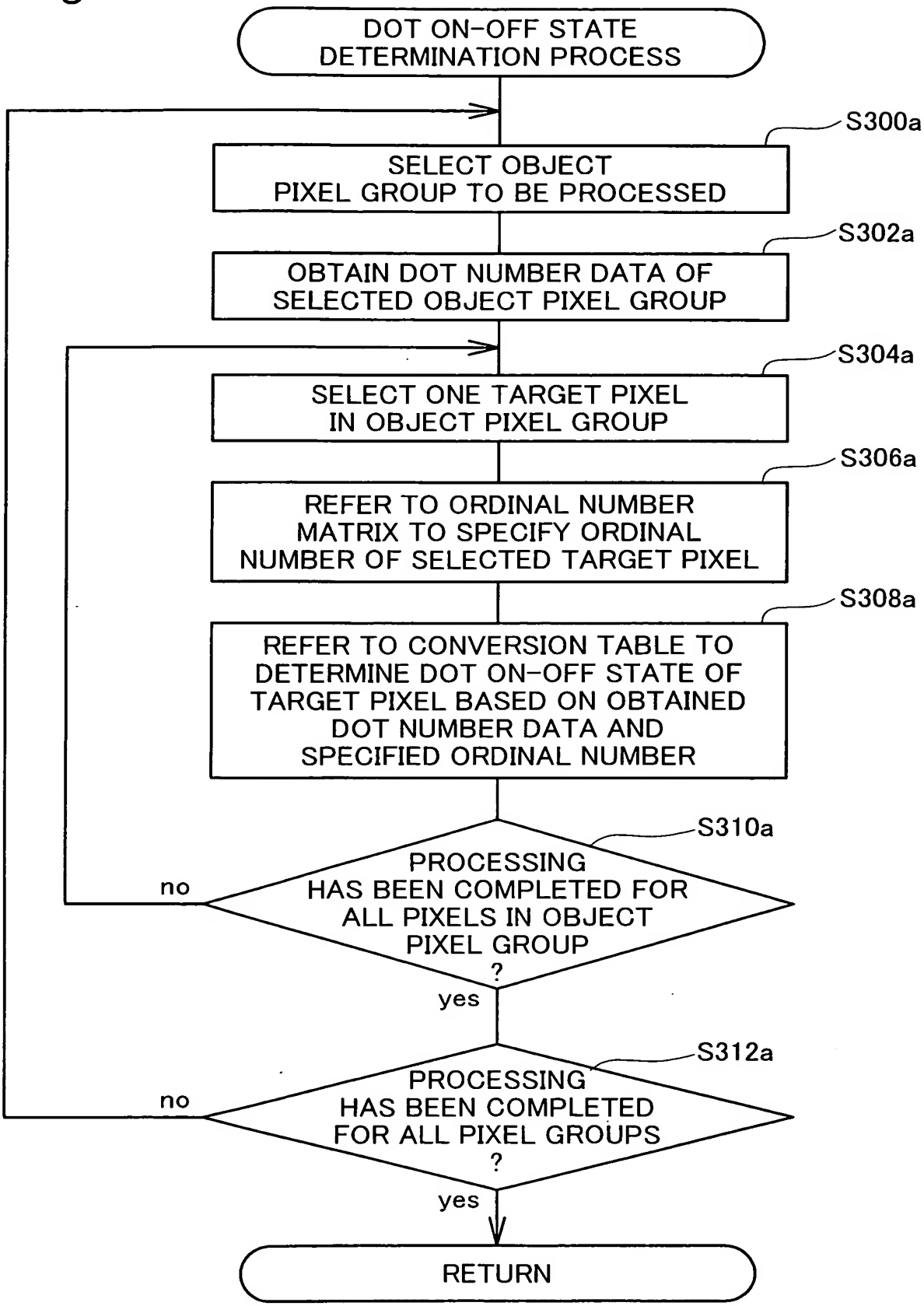

DOT ON-OFF STATE DETERMINATION PROCESS
S300a
SELECT OBJECT PIXEL GROUP TO BE PROCESSED
S302a
OBTAIN DOT NUMBER DATA OF SELECTED OBJECT PIXEL GROUP
S304a
SELECT ONE TARGET PIXEL IN OBJECT PIXEL GROUP
S306a
REFER TO ORDINAL NUMBER MATRIX TO SPECIFY ORDINAL NUMBER OF SELECTED TARGET PIXEL
S308a
REFER TO CONVERSION TABLE TO DETERMINE DOT ON-OFF STATE OF TARGET PIXEL BASED ON OBTAINED DOT NUMBER DATA AND SPECIFIED ORDINAL NUMBER
S310a
PROCESSING HAS BEEN COMPLETED FOR ALL PIXELS IN OBJECT PIXEL GROUP ?
no
yes
S312a
PROCESSING HAS BEEN COMPLETED FOR ALL PIXEL GROUPS ?
no
yes
RETURN

Fig.38a

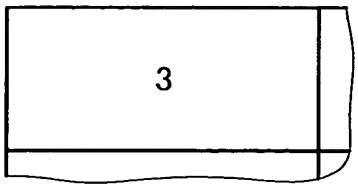


Fig.38b

1	6	3	5
8	4	7	2

Fig.38c

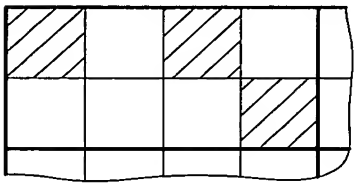


Fig.39

		DOT NUMBER DATA								
		0	1	2	3	4	5	6	7	8
ORDINAL NUMBER	1	0	1	1	1	1	1	1	1	1
	2	0	0	1	1	1	1	1	1	1
	3	0	0	0	1	1	1	1	1	1
	4	0	0	0	0	1	1	1	1	1
	5	0	0	0	0	0	1	1	1	1
	6	0	0	0	0	0	0	1	1	1
	7	0	0	0	0	0	0	0	1	1
	8	0	0	0	0	0	0	0	0	1

Fig.40

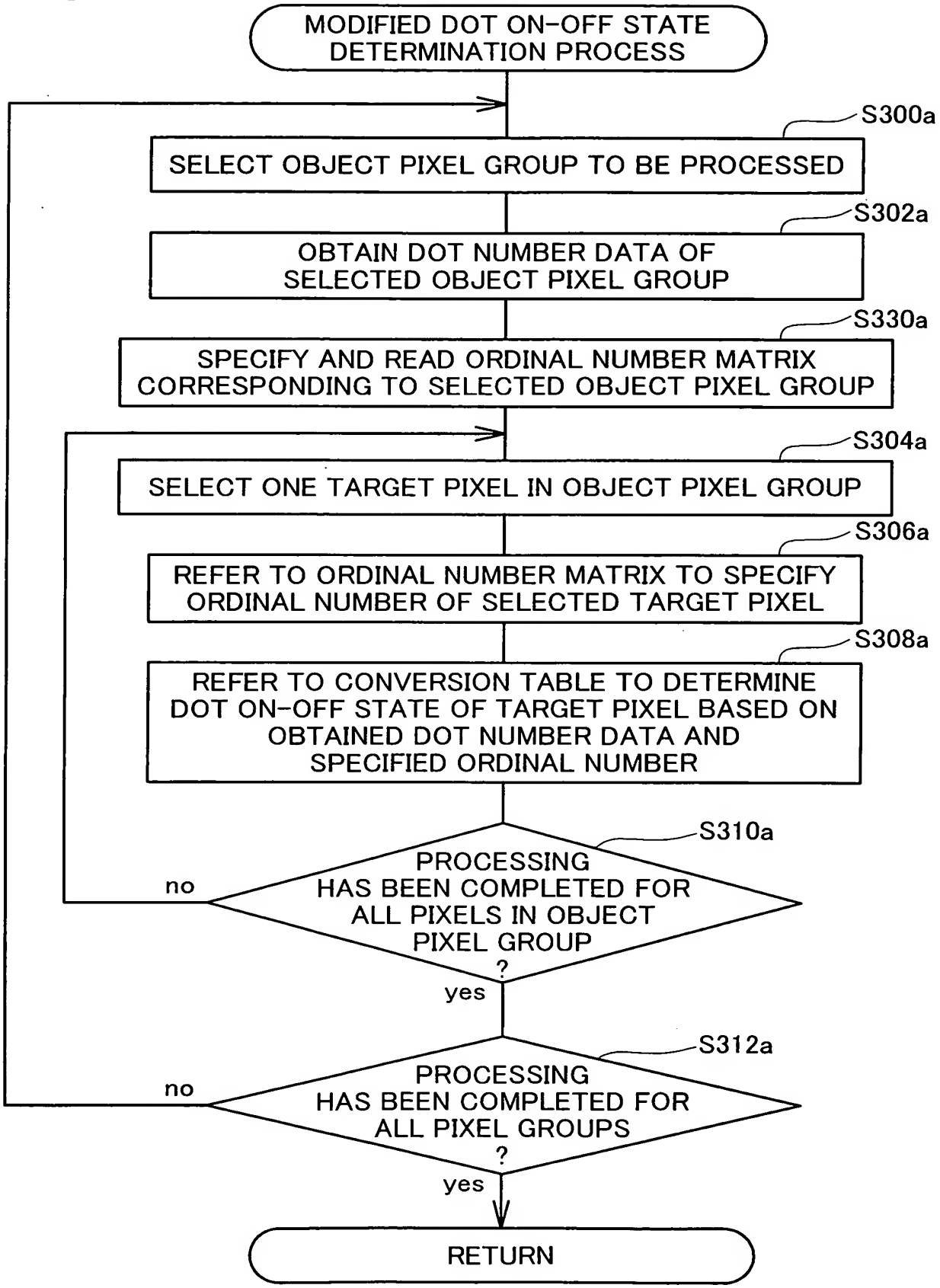

MODIFIED DOT ON-OFF STATE DETERMINATION PROCESS
S300a
SELECT OBJECT PIXEL GROUP TO BE PROCESSED
S302a
OBTAIN DOT NUMBER DATA OF SELECTED OBJECT PIXEL GROUP
S330a
SPECIFY AND READ ORDINAL NUMBER MATRIX CORRESPONDING TO SELECTED OBJECT PIXEL GROUP
S304a
SELECT ONE TARGET PIXEL IN OBJECT PIXEL GROUP
S306a
REFER TO ORDINAL NUMBER MATRIX TO SPECIFY ORDINAL NUMBER OF SELECTED TARGET PIXEL
S308a
REFER TO CONVERSION TABLE TO DETERMINE DOT ON-OFF STATE OF TARGET PIXEL BASED ON OBTAINED DOT NUMBER DATA AND SPECIFIED ORDINAL NUMBER
S310a
PROCESSING HAS BEEN COMPLETED FOR ALL PIXELS IN OBJECT PIXEL GROUP ?
no
yes
S312a
PROCESSING HAS BEEN COMPLETED FOR ALL PIXEL GROUPS ?
no
yes
RETURN

Fig.41a

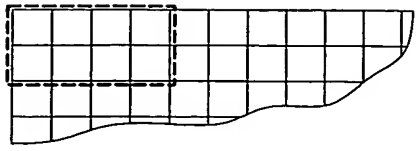


Fig.41b

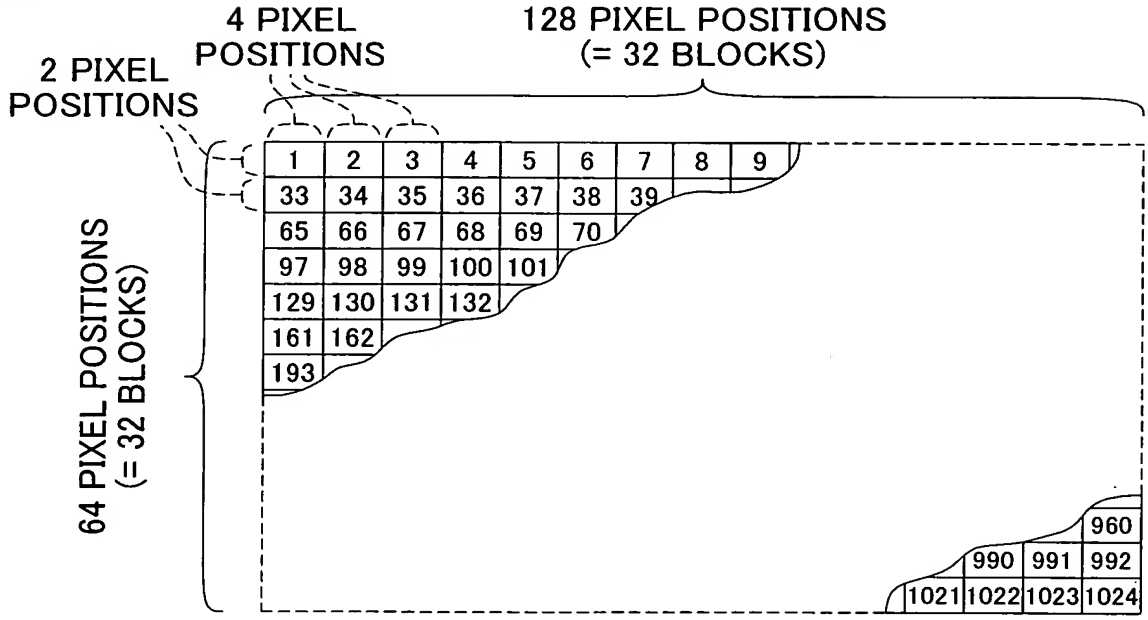
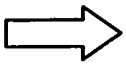


Fig.41c

BLOCK WITH SERIAL NUMBER 1

1	177	58	170
255	109	212	42



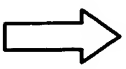
ORDINAL NUMBER MATRIX OF SERIAL NUMBER 1

1	6	3	5
8	4	7	2

Fig.41d

BLOCK WITH SERIAL NUMBER 2

70	186	79	161
242	5	223	48



ORDINAL NUMBER MATRIX OF SERIAL NUMBER 2

3	6	4	5
8	1	7	2

Fig.42a

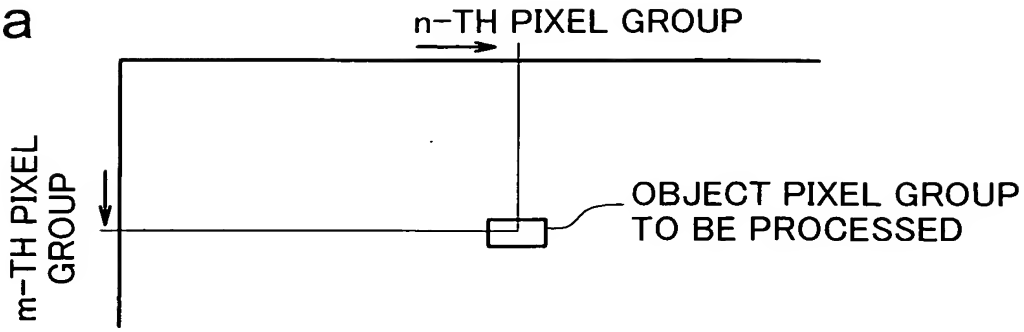


Fig.42b

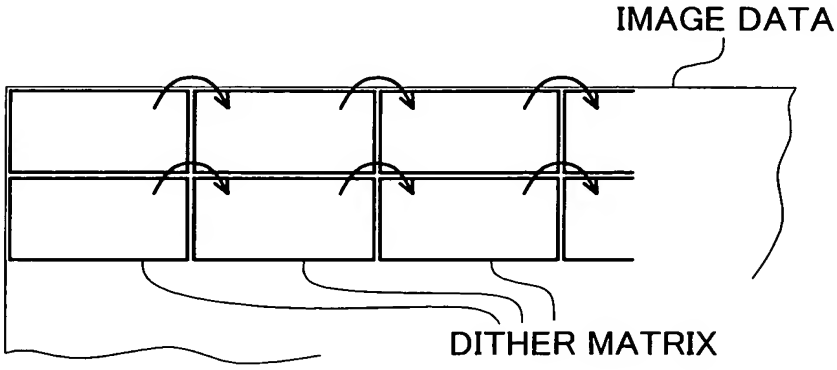


Fig.42c

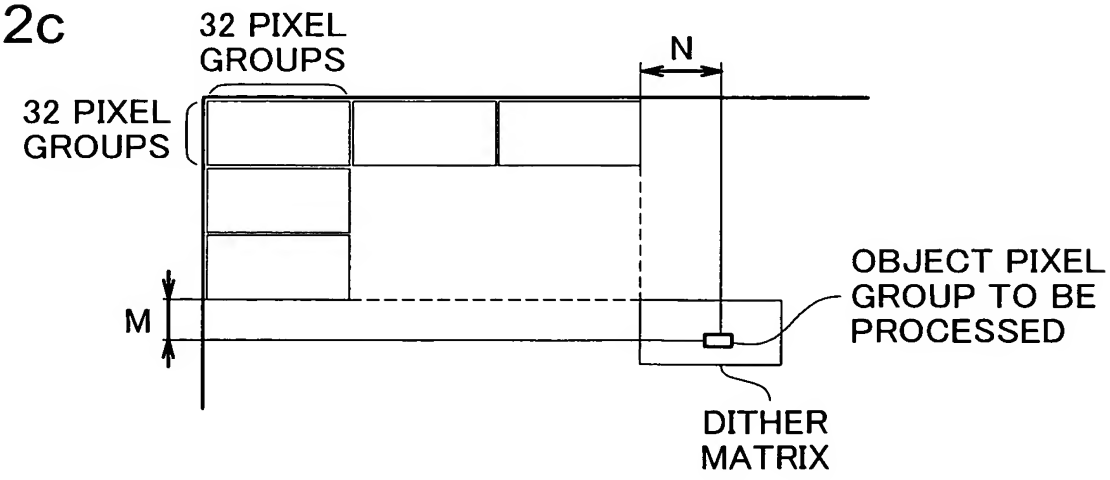


Fig.42d

$$\begin{cases} N = n - \mathrm{int}(n/32) \times 32 \\ M = m - \mathrm{int}(m/32) \times 32 \end{cases}$$

Fig.43

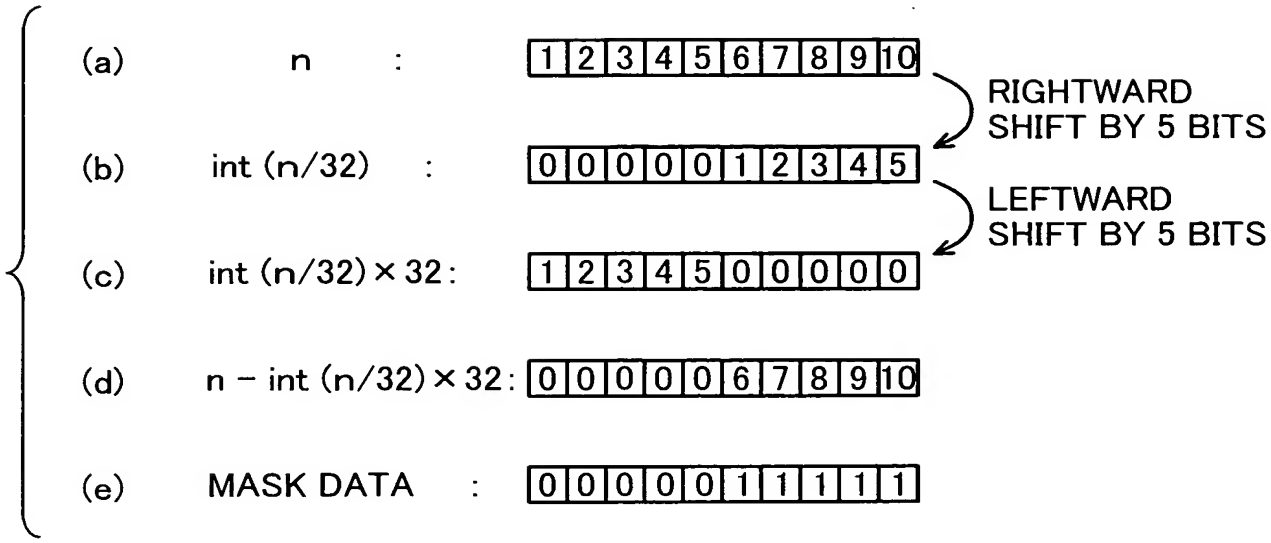

(a) n :
1 2 3 4 5 6 7 8 9 10
RIGHTWARD SHIFT BY 5 BITS
(b) int (n/32) :
0 0 0 0 0 1 2 3 4 5
LEFTWARD SHIFT BY 5 BITS
(c) int (n/32) × 32 :
1 2 3 4 5 0 0 0 0 0
(d) n − int (n/32) × 32 :
0 0 0 0 0 6 7 8 9 10
(e) MASK DATA :
0 0 0 0 0 1 1 1 1 1

Fig.44

SIZE OF DITHER MATRIX (PIXELS)		SIZE OF PIXEL GROUP (PIXELS)		NUMBER OF DIFFERENT ORDINAL NUMBER MATRIXES	DATA SIZE OF EACH ORDINAL NUMBER MATRIX (BYTES)	REQUIRED MEMORY CAPACITY (KILOBYTES)
MAIN SCANNING DIRECTION	SUB-SCANNING DIRECTION	MAIN SCANNING DIRECTION	SUB-SCANNING DIRECTION			
64	64	2	2	1024	1	1
		4	2	512	3	1.5
		4	4	256	8	2
128	64	2	2	2048	1	2
		4	2	1024	3	3
		4	4	512	8	4
128	128	2	2	4096	1	4
		4	2	2048	3	6
		4	4	1024	8	8

Fig.45

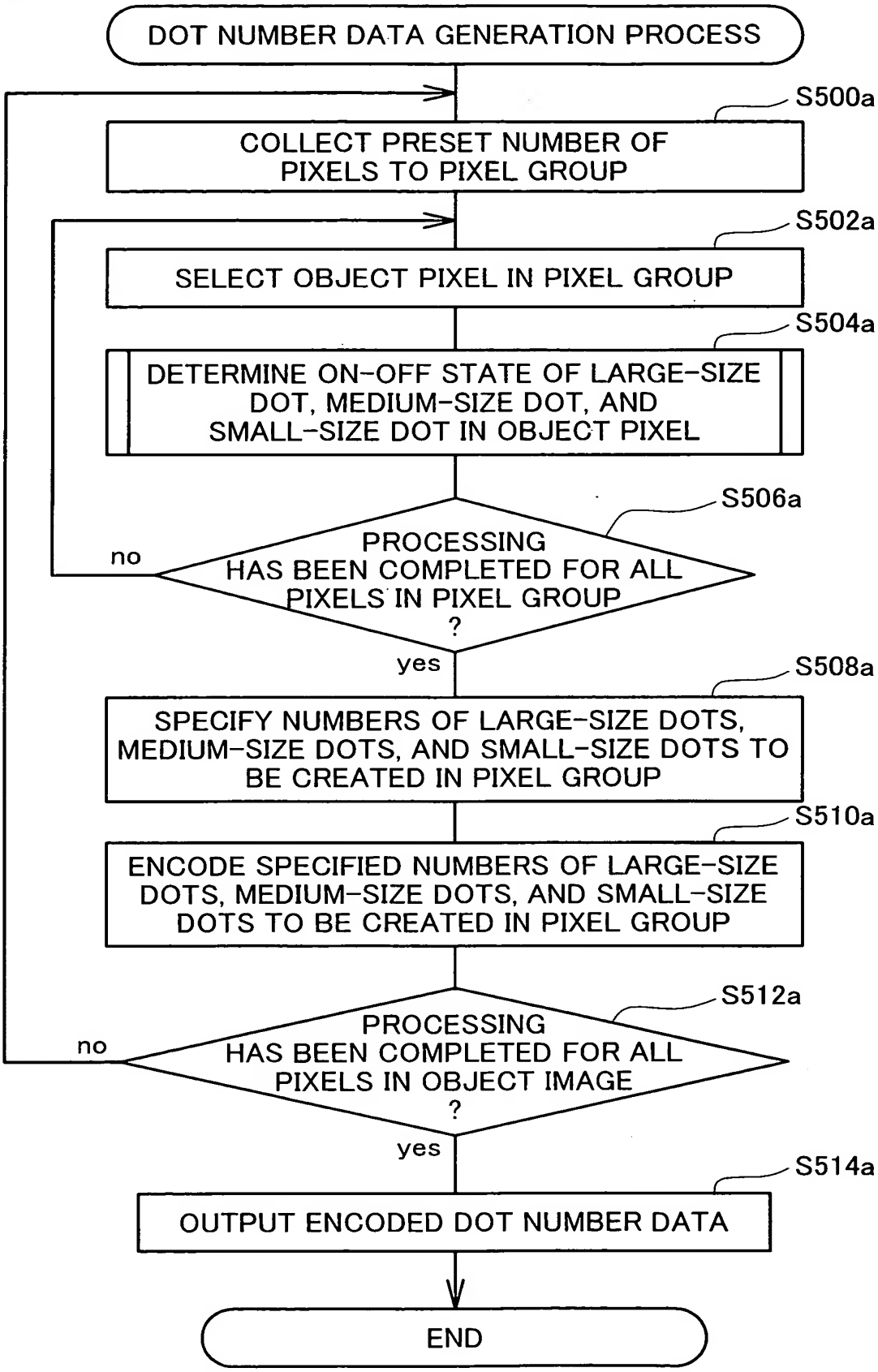

DOT NUMBER DATA GENERATION PROCESS
S500a
COLLECT PRESET NUMBER OF PIXELS TO PIXEL GROUP
S502a
SELECT OBJECT PIXEL IN PIXEL GROUP
S504a
DETERMINE ON-OFF STATE OF LARGE-SIZE DOT, MEDIUM-SIZE DOT, AND SMALL-SIZE DOT IN OBJECT PIXEL
S506a
PROCESSING HAS BEEN COMPLETED FOR ALL PIXELS IN PIXEL GROUP ?
no
yes
S508a
SPECIFY NUMBERS OF LARGE-SIZE DOTS, MEDIUM-SIZE DOTS, AND SMALL-SIZE DOTS TO BE CREATED IN PIXEL GROUP
S510a
ENCODE SPECIFIED NUMBERS OF LARGE-SIZE DOTS, MEDIUM-SIZE DOTS, AND SMALL-SIZE DOTS TO BE CREATED IN PIXEL GROUP
S512a
PROCESSING HAS BEEN COMPLETED FOR ALL PIXELS IN OBJECT IMAGE ?
no
yes
S514a
OUTPUT ENCODED DOT NUMBER DATA
END

Fig.46

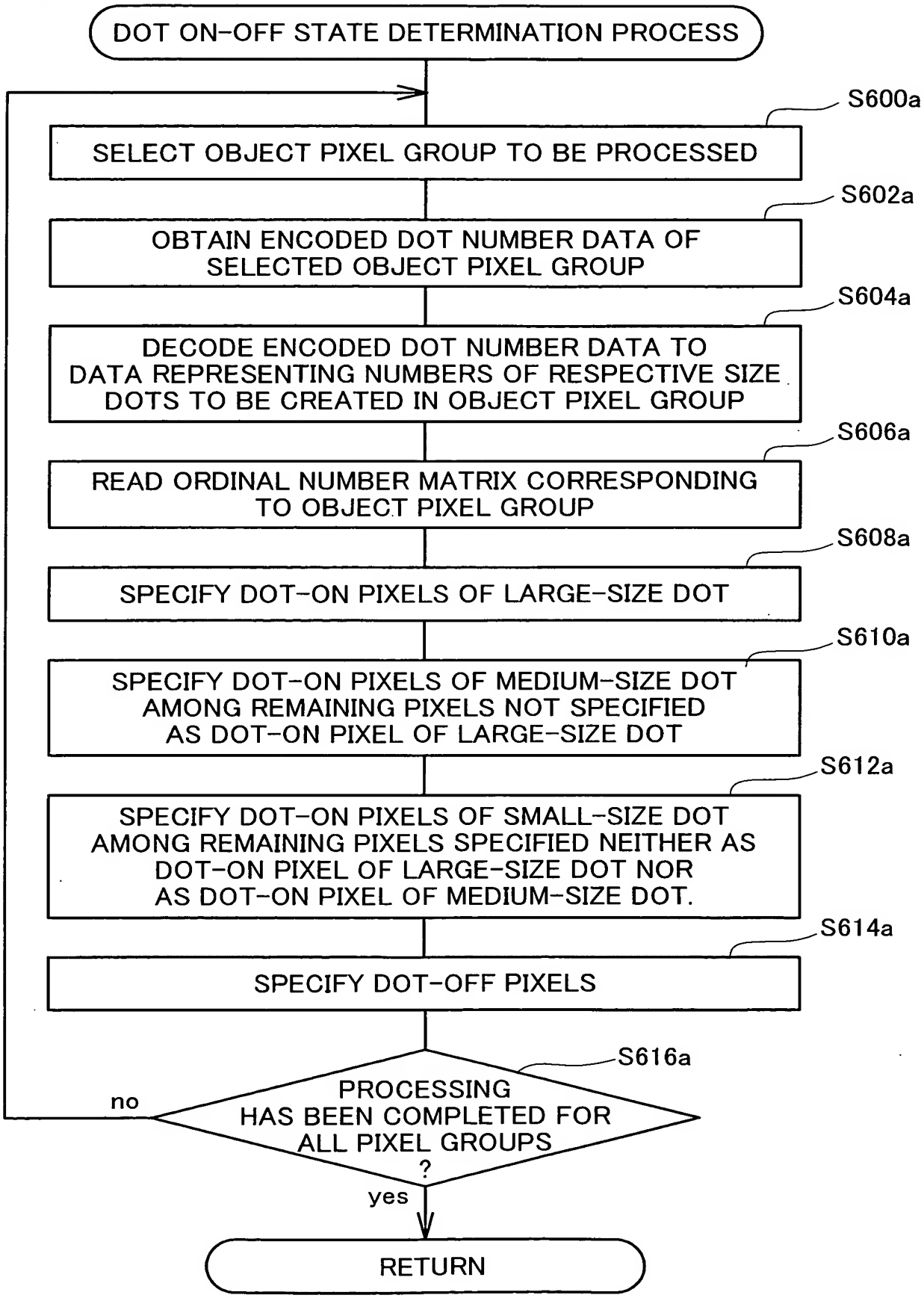

DOT ON-OFF STATE DETERMINATION PROCESS
S600a
SELECT OBJECT PIXEL GROUP TO BE PROCESSED
S602a
OBTAIN ENCODED DOT NUMBER DATA OF SELECTED OBJECT PIXEL GROUP
S604a
DECODE ENCODED DOT NUMBER DATA TO DATA REPRESENTING NUMBERS OF RESPECTIVE SIZE DOTS TO BE CREATED IN OBJECT PIXEL GROUP
S606a
READ ORDINAL NUMBER MATRIX CORRESPONDING TO OBJECT PIXEL GROUP
S608a
SPECIFY DOT-ON PIXELS OF LARGE-SIZE DOT
S610a
SPECIFY DOT-ON PIXELS OF MEDIUM-SIZE DOT AMONG REMAINING PIXELS NOT SPECIFIED AS DOT-ON PIXEL OF LARGE-SIZE DOT
S612a
SPECIFY DOT-ON PIXELS OF SMALL-SIZE DOT AMONG REMAINING PIXELS SPECIFIED NEITHER AS DOT-ON PIXEL OF LARGE-SIZE DOT NOR AS DOT-ON PIXEL OF MEDIUM-SIZE DOT.
S614a
SPECIFY DOT-OFF PIXELS
S616a
PROCESSING HAS BEEN COMPLETED FOR ALL PIXEL GROUPS ?
no
yes
RETURN

Fig.47

ORDINAL NUMBER	DOT NUMBER DATA								•••••			
	0	1	2	3	4	5	6	7		162	163	164
1	0	1	1	1	1	1	1			3	3	3
2	0	0	1	1	1	1	1				3	3
3	0	0	0	1	1	1					3	3
4	0	0	0	0	1	1						3
5	0	0	0	0	0							
6	0	0	0	0	0							
7	0	0	0	0	0							
8	0	0	0	0								

Fig.48

SIZE OF PIXEL GROUP (PIXELS)		NUMBER OF DIFFERENT ORDINAL NUMBERS	NUMBER OF ENCODED DOT NUMBER DATA	REQUIRED MEMORY CAPACITY FOR CONVERSION TABLE (KILOBYTES)
MAIN SCANNING DIRECTION	SUB-SCANNING DIRECTION			
2	2	4	35	0.034
4	2	8	165	0.322
4	4	16	969	3.785

Fig.49

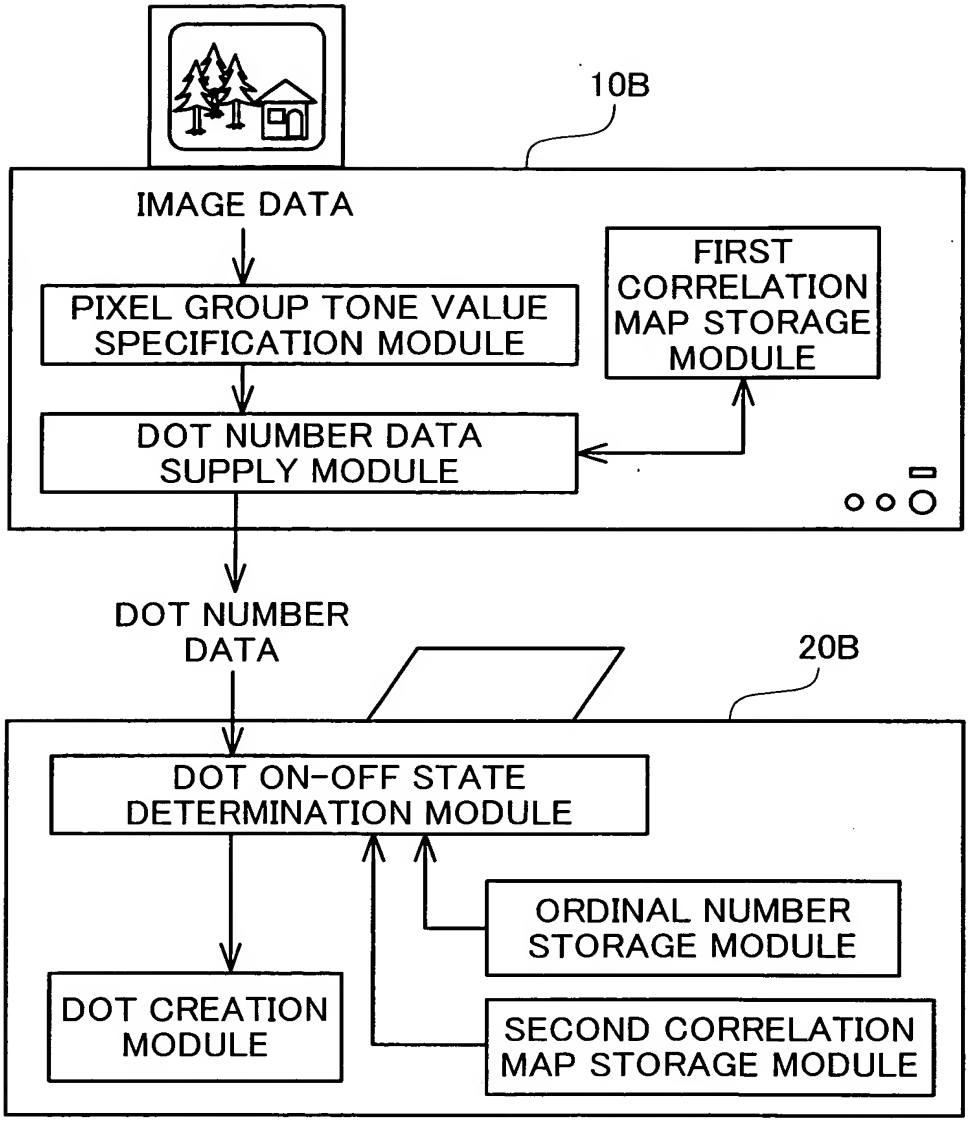

10B
IMAGE DATA
PIXEL GROUP TONE VALUE SPECIFICATION MODULE
FIRST CORRELATION MAP STORAGE MODULE
DOT NUMBER DATA SUPPLY MODULE
DOT NUMBER DATA
20B
DOT ON-OFF STATE DETERMINATION MODULE
ORDINAL NUMBER STORAGE MODULE
DOT CREATION MODULE
SECOND CORRELATION MAP STORAGE MODULE

Fig.50

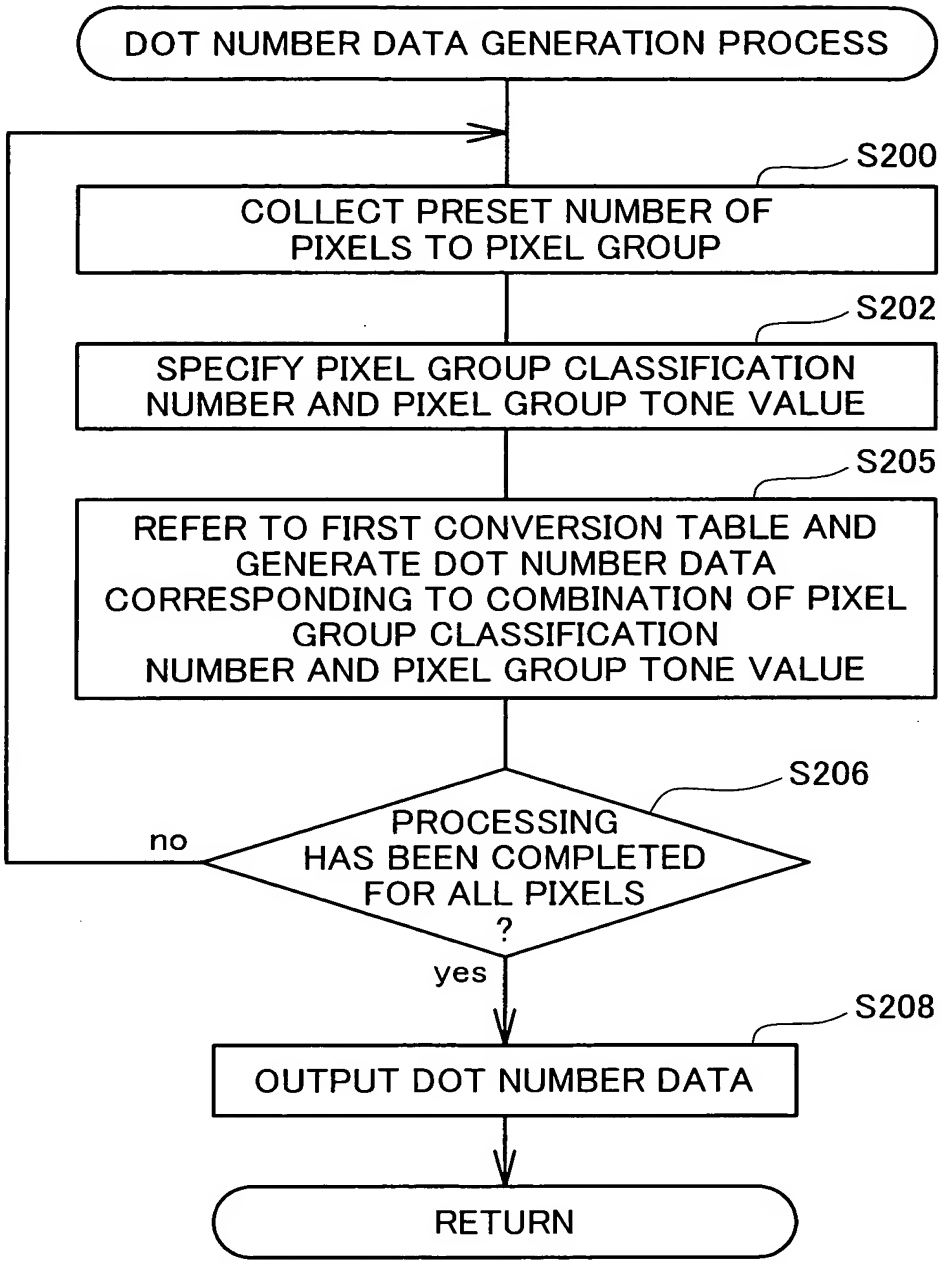

DOT NUMBER DATA GENERATION PROCESS
S200
COLLECT PRESET NUMBER OF PIXELS TO PIXEL GROUP
S202
SPECIFY PIXEL GROUP CLASSIFICATION NUMBER AND PIXEL GROUP TONE VALUE
S205
REFER TO FIRST CONVERSION TABLE AND GENERATE DOT NUMBER DATA CORRESPONDING TO COMBINATION OF PIXEL GROUP CLASSIFICATION NUMBER AND PIXEL GROUP TONE VALUE
S206
PROCESSING HAS BEEN COMPLETED FOR ALL PIXELS ?
no
yes
S208
OUTPUT DOT NUMBER DATA
RETURN

Fig.51

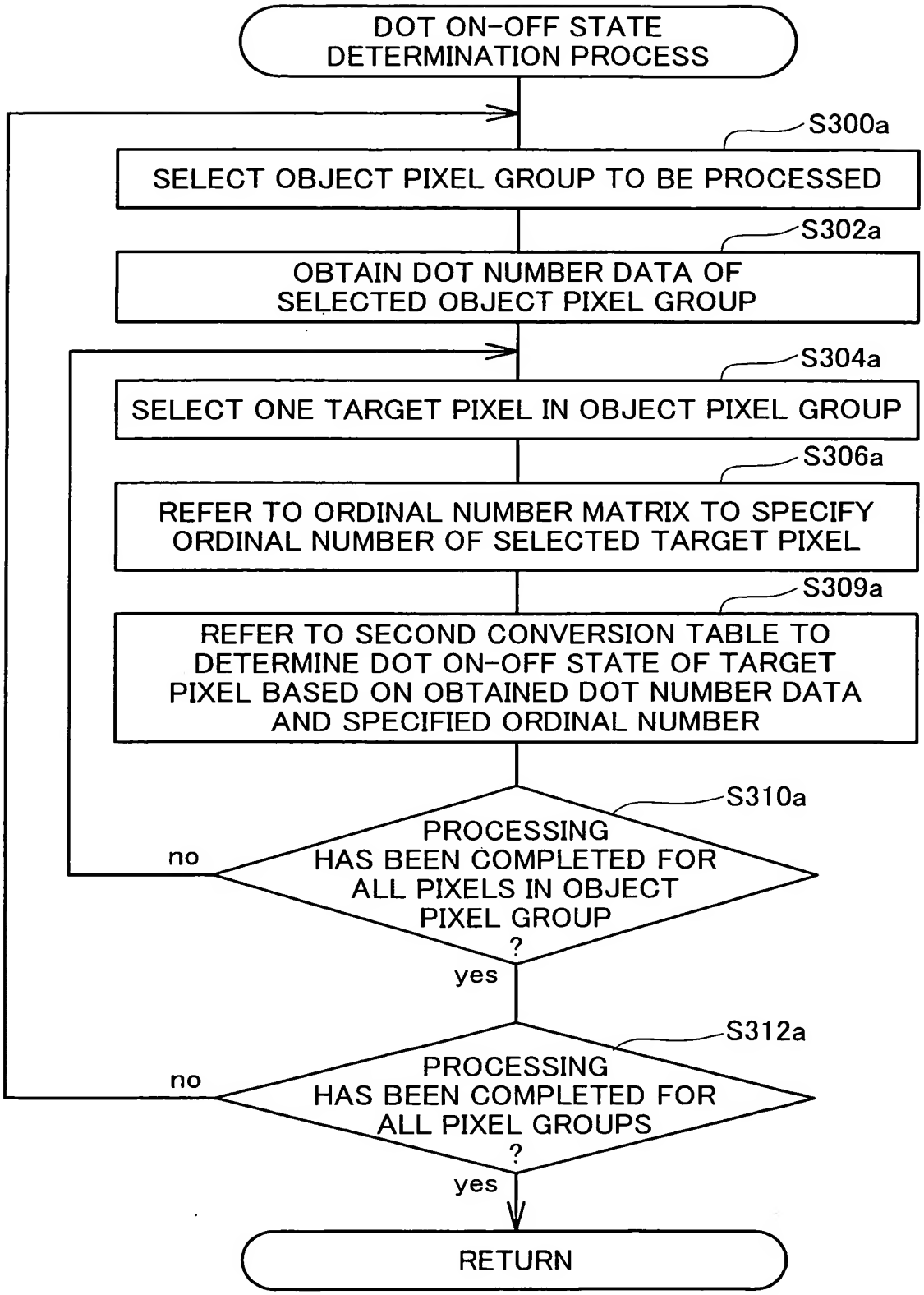
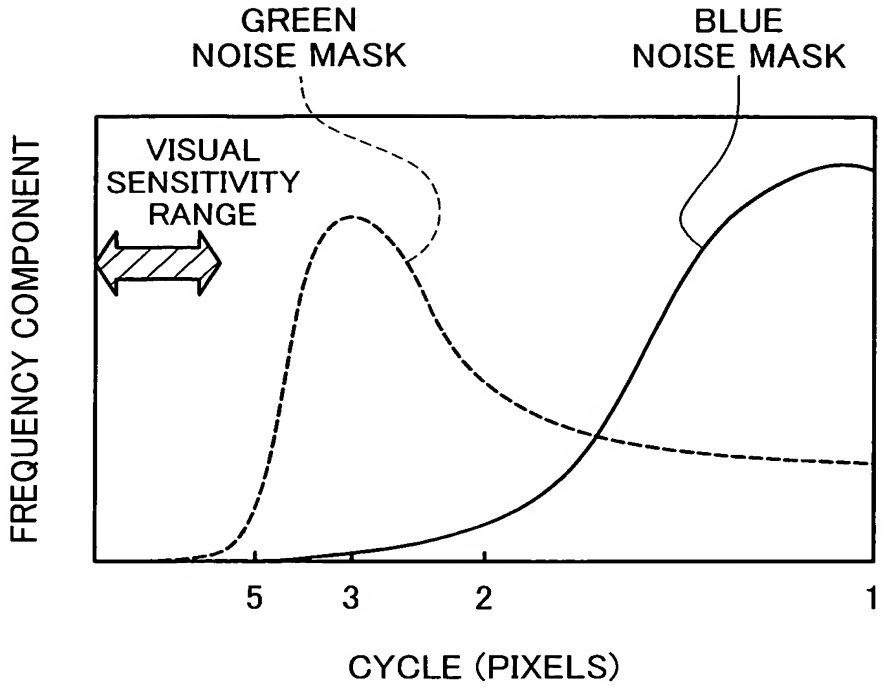

DOT ON-OFF STATE DETERMINATION PROCESS
S300a
SELECT OBJECT PIXEL GROUP TO BE PROCESSED
S302a
OBTAIN DOT NUMBER DATA OF SELECTED OBJECT PIXEL GROUP
S304a
SELECT ONE TARGET PIXEL IN OBJECT PIXEL GROUP
S306a
REFER TO ORDINAL NUMBER MATRIX TO SPECIFY ORDINAL NUMBER OF SELECTED TARGET PIXEL
S309a
REFER TO SECOND CONVERSION TABLE TO DETERMINE DOT ON-OFF STATE OF TARGET PIXEL BASED ON OBTAINED DOT NUMBER DATA AND SPECIFIED ORDINAL NUMBER
S310a
PROCESSING HAS BEEN COMPLETED FOR ALL PIXELS IN OBJECT PIXEL GROUP ?
no
yes
S312a
PROCESSING HAS BEEN COMPLETED FOR ALL PIXEL GROUPS ?
no
yes
RETURN

Fig.52


GREEN
NOISE MASK
BLUE
NOISE MASK
VISUAL
SENSITIVITY
RANGE
FREQUENCY COMPONENT
5
3
2
1
CYCLE (PIXELS)